

การวิเคราะห์ความเป็นนวัตกรรมขององค์กรภาครัฐในประเทศสมาชิกอาเซียน



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บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)
เป็นแฟ้มข้อมูลของนิสิตเจ้าของวิทยานิพนธ์ ที่ส่งผ่านทางบัณฑิตวิทยาลัย

The abstract and full text of theses from the academic year 2011 in Chulalongkorn University Intellectual Repository (CUIR)
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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรดุษฎีบัณฑิต

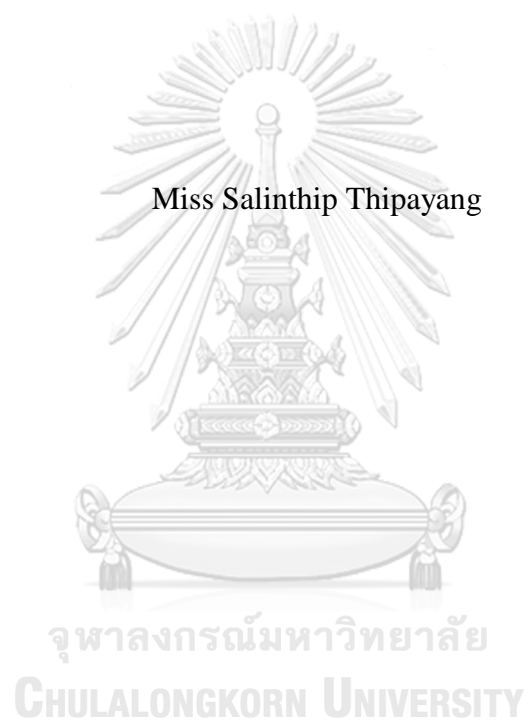
สาขาวิชาธุรกิจเทคโนโลยีและการจัดการนวัตกรรม (สหสาขาวิชา)

บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2560

ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

MEASUREMENT OF ORGANISATIONAL INNOVATIVENESS OF PUBLIC
AGENCIES IN ASEAN



A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in Technopreneurship and
Innovation Management
(Interdisciplinary Program)
Graduate School
Chulalongkorn University
Academic Year 2017
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สถิตทิพย์ ทิพยางค์ : การวัดระดับความเป็นนวัตกรรมขององค์กรภาครัฐในประเทศสมาชิกอาเซียน (MEASUREMENT OF ORGANISATIONAL INNOVATIVENESS OF PUBLIC AGENCIES IN ASEAN) อ.ที่ปริกษาวิทยานิพนธ์หลัก: ศ. กิตติคุณ ดร. อัจฉรา จันทร์ฉาย, อ.ที่ปริกษาวิทยานิพนธ์ร่วม: ผศ. ดร. รัฐ พิษณุางกูร, ผศ. ดร. สุกรี สินธุภิญโญ, 460 หน้า.

องค์กรภาครัฐจำเป็นต้องพัฒนาขีดความสามารถและจัดลำดับความสำคัญกิจกรรมในองค์กร เพื่อตอบ โจทย์และตอบสนองความต้องการของประชาชน ด้วยการเพิ่มระดับความเป็นนวัตกรรมองค์กร ปรับปรุงรูปแบบการบริหารและดำเนินงานให้มีความคล่องตัว มีประสิทธิผลและประสิทธิภาพเพิ่มขึ้น งานวิจัยนี้ใช้วิธีการวิจัยเชิงคุณภาพ ร่วมกับเชิงปริมาณ โดยมีวัตถุประสงค์เพื่อ 1) ศึกษาการวัดระดับความเป็นนวัตกรรมองค์กร และปัจจัยสำคัญที่ส่งผลกระทบต่อระดับความเป็นนวัตกรรมองค์กรในภาครัฐในอาเซียน 2) พัฒนาและตรวจสอบแบบจำลองระบบการวัดระดับความเป็นนวัตกรรมองค์กร 3) พัฒนาระบบออนไลน์ POINTinno.com เพื่อเป็นเครื่องมือวัดระดับความเป็นนวัตกรรมองค์กร และ 4) ทดสอบการยอมรับจากผู้ใช้งานระบบออนไลน์ และประเมินศักยภาพเชิงพาณิชย์ ผลการศึกษาพบว่าระบบการวัดระดับความเป็นนวัตกรรมองค์กรประกอบด้วยปัจจัย 8 ด้าน คือ 1) วัฒนธรรมนวัตกรรมขององค์กร 2) ผู้นำที่สามารถปฏิรูปองค์กรไปสู่ความสำเร็จ 3) ยุทธศาสตร์องค์กร แผนงานพัฒนานวัตกรรม และระบบกลไกติดตามที่มีประสิทธิภาพ 4) พนักงานมีแรงจูงใจและมีความสามารถสูง 5) ทรัพยากรและโครงสร้างพื้นฐานเพื่อนวัตกรรม 6) หน่วยบริหารองค์กรที่มีแนวปฏิบัติและความสามารถส่งเสริมนวัตกรรม 7) ระบบติดตามและประเมินผลการดำเนินงานที่มีประสิทธิภาพ และ 8) เครือข่ายความร่วมมือและปัจจัยภายนอกที่ส่งเสริมนวัตกรรม จากผลการสำรวจ (n = 290) พบว่าระบบออนไลน์วัดระดับความเป็นนวัตกรรมมีความเที่ยงตรงเชิงเนื้อหา Cronbach's Alpha ที่ 0.896 – 0.955 ผลการวิเคราะห์องค์ประกอบเชิงยืนยันพบว่าตัวแปรแฝงของโมเดลมีความสอดคล้องกับข้อมูลเชิงประจักษ์ โดยผลค่าดัชนี $\chi^2(14, N = 290) = 20.024, p = .129, CFI = 0.997, TLI = 0.995, RMSEA = 0.039,$ และ $SRMR = 0.011.$ นอกจากนี้ค่าอำนาจการประกอบมาตรฐานมีค่าอยู่ที่ 0.662 - 0.902 และมีนัยสำคัญทางสถิติที่ $p < 0.01$ ผลการสำรวจทดสอบการยอมรับจากผู้ใช้งานพบว่าผู้ใช้งานมีความพึงพอใจในระดับสูงด้วยคะแนนเฉลี่ย 4.12 (SD 0.771) ผลการประเมินศักยภาพเชิงพาณิชย์พบว่า POINTinno.com มีความน่าสนใจในการลงทุน มีมูลค่าปัจจุบันสุทธิ (NPV) 1.60 ล้านบาท IRR=170% และระยะเวลาในการคืนเงินทุนตั้งต้นที่ประมาณ 12 เดือน งานวิจัยนี้ศึกษาตรวจสอบด้วยวิธีการวิจัยทั้งเชิงคุณภาพและเชิงประจักษ์ สรุปปัจจัยสำคัญและรูปแบบจำลองที่ส่งผลกระทบต่อระดับความเป็นนวัตกรรมองค์กรภาครัฐ และ POINTinno.com เป็นเครื่องมือที่มีประโยชน์ต่อการวัดระดับความเป็นนวัตกรรมองค์กรภาครัฐในประเทศที่กำลังพัฒนาในอาเซียน

สาขาวิชา ศึกษาด้านเทคโนโลยีและการจัดการนวัตกรรม

ปีการศึกษา 2560

ลายมือชื่อนิสิต

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5587814820 : MAJOR TECHNOPRENEURSHIP AND INNOVATION MANAGEMENT

KEYWORDS: ORGANISATIONAL INNOVATIVENESS / ASEAN COMITEE ON SCIENCE AND TECHNOLOGY / ONLINE DECISION SUPPORTING SYSTEM / PUBLIC SECTOR INNOVATION

SALINTHIP THIPAYANG: MEASUREMENT OF ORGANISATIONAL INNOVATIVENESS OF PUBLIC AGENCIES IN ASEAN. ADVISOR: PROF. EMERITUS ACHARA CHANDRACHAI, Ph.D., CO-ADVISOR: ASST. PROF. RATH PICHYANGKURA, Ph.D., ASST. PROF. DR. SUKREE SINTHUPINYO, 460 pp.

As public sector organisations strive to balance priorities to meet increasing public demands, they need to be more innovative and changes bureaucratic behaviors, administrative methods, and implementing new way of conducting routine work processes. This study combines both qualitative and quantitative empirical research methods with the objectives to 1) review how organisational innovativeness (OI) has been measured and identify the important factors affecting OI of public agencies, 2) develop and validate a suitable measurement framework model and indicators for measuring OI in ASEAN public agencies, 3) to create an online web-based application (POINTinno.com) to adequately measure OI, and 4) test how POINTinno.com was perceived by the potential users and assess its commercialisation potential. In order to be more innovative and competitive, public organisations require 1) innovative culture, 2) strong transformation leadership, 3) innovative strategy with effective followed-through mechanism to mitigate changes, 4) motivated and capable workforce, 5) sufficient resources and funds, 6) innovative management capability and practices, 7) effective performance monitoring and evaluation system, and 8) outreach collaborative networks and supportive external contexts and regulations to foster innovation. POINTinno.com was developed to assess OI across ASEAN and the results showed that the scales have high internal consistency and reliability with Cronbach's Alpha values of 0.896 – 0.955 (n = 290). First order confirmatory factor analysis results revealed that the latent variables and indicators in POINT fitted the empirical data with indices of comparative fit index (CFI) of 0.997, Tucker-Lewis Index (TLI) of 0.995, chi-square χ^2 (14, N = 290) = 20.024, $p = .129$, root mean square error of approximation (RMSEA) of 0.039, and standardized root mean squared residual (SRMR) of 0.011. Moreover, the observed factor loadings of the eight factors of POINT ranged from 0.662 - 0.902 and were significant at $p < .01$ indicating that the eight factors are the important indicators of public OI. User technology acceptance test of POINTinno.com revealed that the users were satisfied in using the application as a multi criteria decision analysis and decision support program with high mean average score of 4.12 (SD 0.771). The commercialisation analysis revealed that the NPV of the POINTinn.com was estimated at 1.60 million Baht, IRR=170%, and the estimated payback period of initial total investment at approximately 12 months. This research study contributes to a much needed empirically validated OI framework model as well as the development of a reliable tool to adequately measure, benchmark, and assess public OI in ASEAN developing countries.

Field of Study: Technopreneurship and Innovation
Management

Academic Year: 2017

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ACKNOWLEDGEMENTS

As the saying goes that no one can succeed alone without kindness from others, I am indefinitely indebted to supportive advices, kind guidance and encouragements throughout my Ph.D study from my main advisor Prof. Emeritus Dr. Achara Chandrachai and my co-advisors Asst. Prof. Dr. Rath Pichayankura and Asst. Prof. Dr. Sukree Sinthupinyo. I would like to express my sincere gratitude and appreciations to thank Assoc. Prof. Dr. Pasu Decharin, Assoc. Prof. Dr. Damrong Wattana, Assoc. Prof. Dr. Duanghathai Pentrakoon, and Dr. Phannaphatr Savetpanuvong for their kindness in giving me the opportunity to be able to complete my Ph.D study and providing valuable comments to improve my thesis.

I wish to especially thank the invited experts at the ASEAN Secretariat and ASEAN COST networks: Dr. Alexander A. Lim, Ms. Alice Lee Sing Cheong, Mr. Dimas Adekhrisna, Mr. Bob Raini Rambli, Mr. Sok Chea, Dr. Trina Fizzanty, Mr. Kongsaysy Phommaxay, Dr. Sombounmy Phomtavong, Dr. Mokhtar Tahar, Dr. Charlie Yeo Tiong Chia, Prof. Dr. Mi Sandar Mon, Dr. Amelia P. Guevara, Dr. Sarah Chang Kai Chen, Ms. Melissa Leong, Ms. Thamaporn Apison, Ms. Sawamitree Promyos, Dr. Duangrat Gansawat, Dr. Kitipong Promwong, Dr. Rungnapa Tongpool, Mr. Asira Chirawithayaboon, Mr. Parinand Varnasavang, Ms. Bui Thi Thu Lan, and Dr. Bach Tan Sinh for providing me with the interviews and useful inputs for my research.

I wish to especially thank Dr. Janjira Janchome for her kindness in providing me with useful advices and encouragements. I also wish to especially thank the invited IOC experts: Asst. Prof. Dr. Paisarn Sonthikorn, Dr. Piengpen Wongnapapan, Assoc. Prof. Dr. Chris Wong Chow Jeng, and Assoc. Prof. Dr. Irene S. C. Siaw for their valuable inputs and comments to improve the model.

I wish to express my sincere gratitude to all the respondents who agreed to participate in my quantitative surveys in Thailand and other ASEAN member countries. Without their supports and contributions, I would not have the essential data for this research.

I wish to especially thank my friends and colleagues at CUTIP6 for their constant supports and encouragements. I also wish to especially thank the teachers and supportive staff at Technopreneurship and Innovation Management Program for their helps and kind assistance throughout the course of my study.

Lastly, I wish to express my deepest gratitude to my mother Mrs. Jiraporn Thipayang, My brother Mr. Thammathip Thipayang, my cousin Ms. Vimvipha Vithayarom and other family members and friends for their unwavering supports and never stop believing in me. And for my dearest husband Dr. Allan Fernando Hon and our dearest son, Master Huxley Anantakhun Hon, for always providing me with unconditional love, fulfilled happiness and inspirations.

Salinthip Thipayang

July 2018

“Our lives are not our own. From womb to tomb, we are bound to others, past and present, and by each crime and every kindness, we birth our future.”

From: The Revelation of Sonmi 451, Cloud Atlas 2012 Movie.

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CHAPTER 1

INTRODUCTION

1.1 Background and importance of problems

Public sector organisations play crucial roles as regulators and service providers and account for a significant share of economic development especially in ASEAN developing economies. In the current knowledge economy and improved information and communication technologies global connectivity, government agencies are increasingly under pressure to be more effective in delivering satisfactory societal services and solutions in responsive and timely manner under limited budgets and resources. As governments strive to balance priorities including the effective allocation of resources and meeting public expectations, it is becoming increasingly clear that new approaches are needed. Governments will have to innovate and find ways to make difficult things easy in the areas of service delivery, process improvement, regulation and policy implementation (Ernst & Young LLP., 2017).

Innovation in non-profit seeking public sector organisations differ from profit orientated private enterprises in various aspects including more emphasis on changes of bureaucratic behaviours, administrative methods, and implementing new way of conducting routine work processes (Halvorsen et al., 2005; and Kattel et al., 2014) towards improved public services, better performance, and creating values for society. Public sector organisation innovation is linked to concept of organisational reform or New Public Management (NPM) (Hood, 1991), which is a new point of view towards the public organisational design to be more business-like and more efficient to service the private sector and the citizens.

Innovation management and assessment in public organisations are high on many government agendas especially in the developed countries because improved performance and better service delivery can greatly increase national competitiveness. Nevertheless, efforts to better understand and promote public sector innovation are greatly hindered by a lack of empirical quantitative research evidence (Bloch, 2011).

While governments have started to embrace public sector innovation agendas, knowledge and analysis in this area remains limited and fragmented. Developing knowledge of what creates successful innovations depends on a systematic approach where the mechanics of change and its enabling factors are understood, alongside an understanding of the particular challenges faced by the public sector, and the needs and preferences of its users as suggested in the Innovation Policy Platform created by the World Bank Group and the Organisation for Economic Co-operation and Development (OECD). The problems lie in the measurement and analysis of innovation or determining what factors of organisational innovativeness or characteristics lead to successful implementation of new ideas or initiatives. This also links to the concepts of organisation theory, human resources management, and adaptation to design organisational structures, operations, and processes in order to best cultivate public sector innovations, and make all the systems work together effectively and efficiently.

Public sector organisations face inherent barriers and conflicts when they try to be more innovative. The disruptive nature of innovation involving implementation of new changes appears to be at odds with the fundamental role of government institutions of reducing uncertainty and introducing stable routines (Bason, 2010). The current barriers to innovation and innovativeness in public organisations are underpinned by the concept of organisational ambidexterity of the nested paradox between exploitation (processing and refining the core operation and production for efficiency) and exploration (prospecting activities for new opportunities and innovation) (Boukamel & Emery, 2017; and March, 1991). Results from the pan-European wide Public Sector Innovation Survey showed that successful innovation requires contributing factors of organisational innovativeness such as leadership, culture, and institutional capacities and capabilities (European Commission, 2012). As a consequence, fostering innovation is less a matter of successfully implementing innovation processes but rather more on a matter of improving innovativeness or innovation capability (Andrews et al., 2015).

Research in public sector innovation and innovativeness (here defined as propensity and capability to introduce, manage, and foster innovation) has gained growing attentions and interests as innovation is seen as a mean to address challenging

societal demands through increasing efficiency and effectiveness and better interactions of public organisations to other sectors. However, organisational innovation and innovativeness need to be distinctively discussed in order to analyse and determine how innovation occurs and what factors or variables contribute to organisational innovativeness. Kamaruddeen et al. (2010) concluded from their study that innovation seems to incorporate the adoption and/or implementation of new defined activities rather in subjective ways, whereas innovativeness normally embodies some kind of measurement contingent on an organisation's propensity towards innovation. Subramanian & Nilakanta (1996) understand organisational innovativeness as an enduring organisational trait; and truly innovative organisations are those that exhibit innovative behaviour consistently overtime. In general, innovation must have occurred for an organisation to be considered innovative. However, for innovation to occur, the organisation must possess certain traits or characteristics that are conducive to innovation. Therefore, in this case innovativeness is antecedent to innovation.

In the study on the evolution of organisational ambidexterity in the public sector and current challenges for innovation capabilities by Boukamel & Emery (2017), the authors concluded that the current research on public sector innovation has now shifted from focusing on improving public service delivery, incentives and barriers of innovation, and innovation processes towards tendency to innovate or improving innovation capability, which is the main concept and definition of innovativeness in this study. Hence, this research project, studying factors affecting public sector organisational innovativeness and developing a web-based application to adequately measure organisational innovativeness of public agencies, pursues the most up to date research efforts and the latest focus on public sector innovation management research.

The literature on how to sufficiently measure public sector organisational innovativeness has not reached consensus although to some extent internationally agreed concepts and metrics such as those stipulated in the Oslo Manual exist for measuring innovation activities in private sector (OECD, 2010). Most innovation and organisational innovativeness related studies are dedicated to innovation in private firms but not in public or government agencies. Furthermore, there are even less number of research articles in mainstream peer reviewed journals about innovativeness compare

to innovation in public sector and most of them are in the topics of innovation policy and public procurement. Thus, our research will help contribute to the current academic research gap in factors and measurement framework of public organisational innovativeness and also provide a practical solution in a form of decision support system tool to measure public organisational innovativeness across developing ASEAN member countries.

There is a pressing need to develop reliable tools or applications to adequately measure, benchmark, and quantify the levels of organisational innovativeness in public agencies. However, up to date, most of the existing tools for measuring public organisation innovation and innovativeness have been studied, developed by, and used in the developed economies such as in OECD member countries, Europe (Hollanders et al, 2013 and Hollanders & Tarantola, 2011), Norwegian countries (Bloch, 2013; Bloch, 2010; Mortensen, 2010; Jorgensen, 2010; Annerstedt & Bjorkbacka, 2010; Bugge et al., 2011), UK, Australia (DIISR, 2011a; DIISR, 2011b; and DIISR, 2011c) and South Korea (Yoon, 2006 and Kim et al., 2007).

Prior to this study, there had been no formal attempt to empirically create and validate structural measurement framework and strategic decision support application especially designed to measure, compare, and assess the levels of organisational innovativeness in public agencies under the networks of the ASEAN Committee on Science and Technology (COST) and the ASEAN Ministerial Meeting on Science and Technology (AMMST). The ASEAN COST is the main supranational intergovernmental committee under the AMMST, which is one of the highest official diplomatic divisions under the ASEAN Economic Community (AEC) pillar. The networks of the ASEAN COST are those government agencies and ministries of the ten ASEAN member countries with the primary goals to develop and promote science, technology, and innovation (STI) activities. These public sector agencies are policy makers or regulators, government funding agencies, and research centres that are part of the national and international system of innovation. Measuring, assessing, and benchmarking their organisational innovativeness can help identify the areas that should be focused on for improvement in order to raise organisational standard, operational effectiveness and efficiency, and national and regional competitiveness.

1.2 Research questions

1. How should organisational innovativeness be sufficiently measured and what are the important factors affecting organisational innovativeness of public agencies?
2. What are a suitable measurement framework model and indicators for measuring organisational innovativeness of public agencies?
3. What are the features of an online web-based application that can adequately measure and assess public organisational innovativeness?
4. How well is the new application - POINTinno.com accepted by the potential users and is it commercially viable?

1.3 Research objectives

1. To review how organisational innovativeness has been measured and identify the important factors affecting organisational innovativeness of public agencies.
2. To develop and validate a suitable measurement framework model and indicators for measuring organisational innovativeness of public agencies.
3. To create an online web-based application (POINTinno.com) to adequately measure organisational innovativeness of public agencies.
4. To test how POINTinno.com is perceived by the potential users and assess its commercialisation potential.

1.4 Overview of the thesis chapters

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| 2.1 Organisation theory | | | |
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| 2.5 Decision Support System (DSS) | | | |
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| (Research objective No. 1) | | | |
| Chapter 3: Research Methodology | | | |
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| (Research objective No. 1) | (Research objective No. 2) | (Research objective No. 3) | (Research objective No. 4) |
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| 4.3 Comparison of POINT sub-factors in ASEAN | | | |
| (Research objective No. 1 & 2) | | | |
| Chapter 5: Quantitative results and statistical analysis | | | |

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| (Results phase 2) |
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| <p>Chapter 6: POINTinno.com web-based application development</p> <p>(Results phase 3)</p> |
| <p>6.1 The Factors and indicators of POINTinno.com</p> <p>6.2 Development of the POINT index scores</p> <p>6.3 Cluster analysis of the total POINT Index Scores into distinct groups</p> <p>6.4 Outputs and user recommendation page of POINTinno.com</p> <p>6.5 Program system support development and user webpage interface design of POINTinno.com</p> <p>6.6 Pretesting and refinement before launch</p> <p style="text-align: center;">(Research objective No. 3)</p> |
| <p>Chapter 7: User acceptance test and commercialisation potential assessment</p> <p>(Results phase 4)</p> |
| <p>7.1 User acceptance test</p> <p>7.2 Commercialisation potential assessment</p> <p style="text-align: center;">(Research objective No. 4)</p> |
| <p>Chapter 8: Conclusions and discussions</p> |
| <p>8.1 Conclusions and discussions</p> <p>8.2 Limitations of the research</p> <p>8.3 Recommendations</p> |

1.5 Scope of study

1. This study employs both qualitative research method via semi-structure in-depth interviews and quantitative research method via online survey questionnaires to measure organisational innovativeness of the selected public agencies in ASEAN and create POINTinno.com online tool as a decision support system.

2. The qualitative research was conducted with the selected public organisations in the ASEAN member country networks of the ASEAN Committee on Science and Technology (COST) with the main organisational mandates to develop and promote science, technology and innovation (STI).

3. The quantitative research was conducted with the selected public organisations in the ASEAN member countries.

4. The user acceptance survey was conducted with the selected public organisations in the ASEAN member countries.

1.6 Academic and practical contributions

Academic contributions

The scales and construct for measuring organisational innovativeness in this study were subjected to internal consistency reliability test as well as content and criterion validations to confirm that the proposed latent variables fit the observed data and can adequately measure organisational innovativeness of public agencies in developing countries. Therefore, the validated scales and indicators can be reliably used to measure and compare cross-country organisational innovativeness of public agencies in ASEAN. Apart from this, the validated scales and indicators of POINT that were developed during the course of this research can be a useful academic reference source for other researchers and subsequent studies in the organisational innovativeness domain.

Practical contributions

This research identifies and reviews important factors that can influence organisational innovativeness of public agencies namely culture, leadership, strategy, workforce, resources, management capability, performance, and networks and external contexts. POINTinno.com – the online tool that was developed in this study - can be used as a decision supporting system programme to pinpoint the areas in which the organisation leaders, policy makers, and managements should focus on in order to foster innovation, improve performance, and increase competitive advantage of their organisation.

1.7 Key definitions of terms

Public organisation or public agency is defined as an organisation or agency that is part of or represents a division or operating unit under a national, state, or local government and receives its mandates and funding supports from a government or governing constitution. In this study, the levels of analysis of a public organisation can be at a ministerial level, an agency under a ministry, or a division within an agency under a ministry.

Innovation in public agencies is defined as the introduction, adoption, or implementation of a new idea, strategy, management practice, communication process or operational method, which results in a new development and improved outcome and performance within the organisation and may result in better service quality delivery or outcome that increases efficiency, policy effectiveness, and values to the society.

Organisational innovativeness of public agencies is defined as the overall tendency and capability of the public organisation to introduce and implement new initiatives, innovative activities, processes, practices, and cultures that improve its operation, performance, effectiveness, efficiency or competitiveness.

CHAPTER 2

LITERATURE REVIEW

In Chapter 2, the bodies of literature that are relevant to the research questions and objectives in this study are reviewed. The aims of this research are to identify the important factors and variables that affect organisational innovativeness of public agencies in order to develop, empirically test, and validate a suitable measurement framework model and indicators of POINTinno.com (Public Organisational Innovativeness Tool) – a decision supporting system (DSS) web-based application to assist public organisation leaders, policy makers, and managers to measure and compare the components of organisational innovativeness in their organisation with other public organisations in their country and in ASEAN. POINTinno.com can help public organisations pinpoint the specific areas of organisational innovativeness that should to be focused on for strategic improvement of organisation performance and competitiveness. The topics of literature relevant to the development of POINTinno.com are summarised in Figure 2.1 and are discussed and reviewed in this chapter.

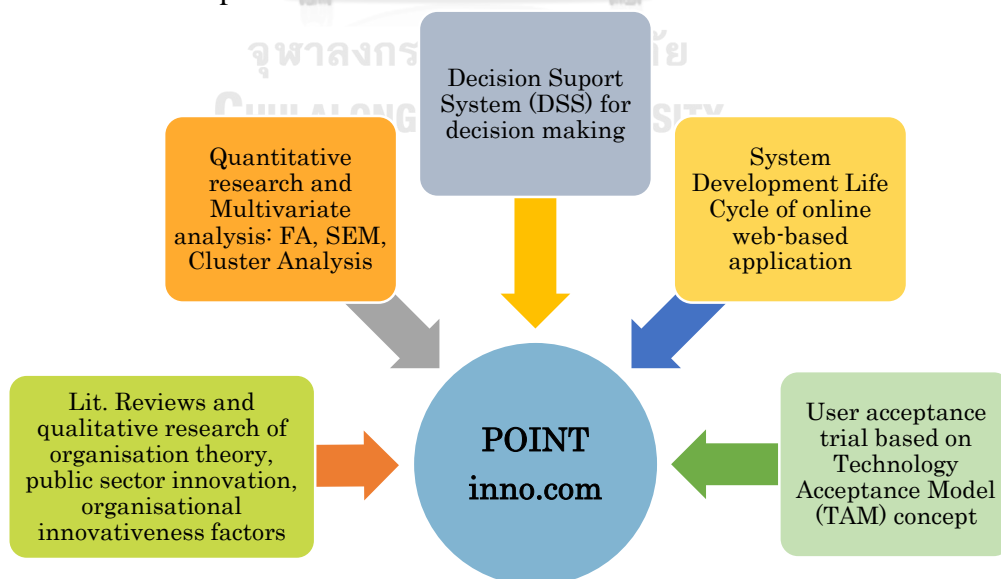


Figure 2.1: Literature topics for the development of POINTinno.com

2.1 Organisation theory

Organisation theory is a collection of general proposition about organisations (Starbuck, 2005) or a macro approach to organisations that analyses the whole organisation as a unit (Daft et al., 2017). The idea may have originated from Gulick (1937) who first used the term “the theory of organisation” but it was Simon (1950, 1952) who most actively promoted the actual phrase “organisation theory” as a broad category that included scientific management, industrial engineering, psychology, human resources management, and strategy (Starbuck, 2005). Some practical applications of organisation theory proposed by Hatch & Cunliffe (2013) are summarised in Table 2.1

Table 2.1: Practical applications of organisational theory proposed by Hatch & Cunliffe (2013)

| Area | Practical applications of organisation theory |
|------------------------|--|
| Strategy/ Finance | Those who want to increase the value of a company need to know how to organise to achieve strategic goals. Those who want to monitor and design organisational processes that make sense within the context of the organisation’s culture and allow for needed human growth and creativity. |
| Marketing | Marketers know that to create successful brands the organisation must stand for and deliver the brand promise. A thorough understanding of what organisation is and how organisations must behave will make their efforts to align an organisation with its brand strategy and identity more trustworthy and productive. |
| Information Technology | The way information flows through the organisation affects work processes and outcomes. So knowing organisation theory can help IT specialist identify, understand, and serve the organisation’s informational needs as |

| Area | Practical applications of organisation theory |
|-----------------|--|
| | they design and promote the use of their information systems. |
| Operations | Value chain management requires that managers interconnect their organising processes with those of suppliers, distributors, and customers. Organisation theory not only supports the technical aspects of supply chain and business systems integration, but explains their political, social, and cultural aspects as well. |
| Human Resources | All HR activities from recruiting to compensation have organisational implications and hence benefit from knowledge provided by organisation theory. Organisational development and change are particularly important elements of HR that demand deep knowledge of organisations and organising, and organisation theory provides content for executive training programs. |
| Communication | To design communication systems, corporate communication specialists must be sensitive to the interpretive processes of employees and other stakeholders. Organisation theory helps them understand how people interact with each other and the environment so that information and knowledge can be shared. |

In this study, organisation theory and its applications are applied to how organisational innovation and innovativeness can be managed and foster in public sector organisations.

2.1.1 Definition of organisation

According to Daft et al. (2017), an organisation can be defined based on four characteristics of (1) social entity that is (2) goal-directed, (3) designed as deliberately structured and coordinated activity system, and (4) linked to the external environment. The key element of an organisation is not a building or a set of policies and procedures but are the people that are part of it and their relationships with one another. The modern contemporary importance and purposes of organisations are:

- Bringing together resources to achieve desired goals and outcomes;
- Producing goods and services; facilitating innovation;
- Harnessing modern manufacturing, services and information technologies;
- Adapting to and influencing a changing environment;
- Creating value;
- Accommodating ongoing challenges of diversity, ethics and the motivation and coordination of employees.

Organisations can also be described as a prototypical example of hierarchical multilevel social system in which relationships and interactions among lower-level actors (e.g. individuals) depend on the presence of ties among higher-level actors (e.g. organisation departments or divisions) (Zappa & Lomi, 2015; Wang et al. , 2013; Kozlowski & Klein, 2000).

2.1.2 Organisation structure and contextual dimensions

To understand and evaluate organisations, it is important to examine both the structure dimension and the contextual dimensions that are interacting with and influence each other as shown in Figure 2.2. Large organisation size with a routine technology and a stable environment all tend to create an organisation that has greater formalization, specialisation, and centralisation.

Structural dimensions

- Formalisation refers to the reliance upon written documentation in the organisation such as procedures, job descriptions, regulation, and policy manual.
- Specialisation is the degree to which organisational tasks are subdivided into separate jobs. If Specialisation is extensive each employee performs only a narrow range of tasks. If specialization is low, employees perform a wide range of tasks in their jobs. Specialization is sometimes referred to as the division of labour.

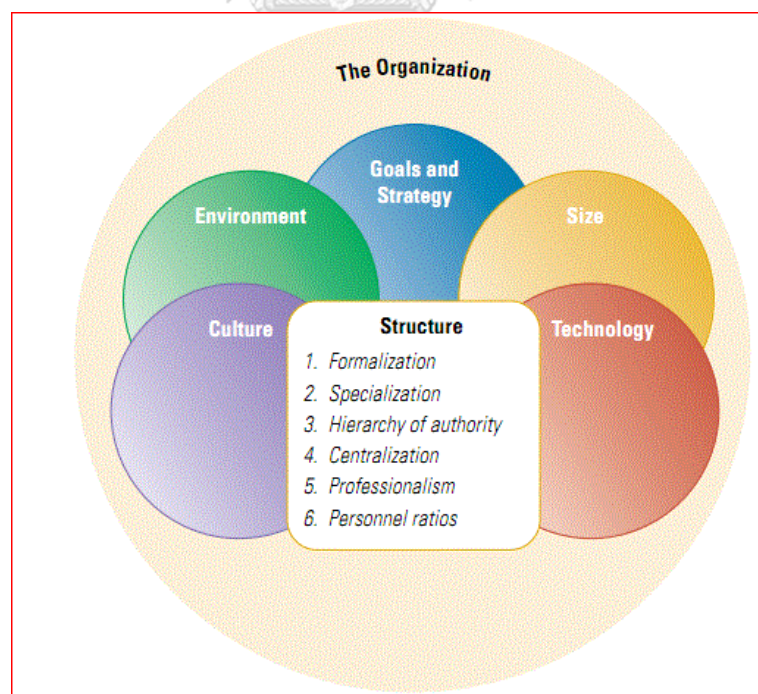


Figure 2.2: Interacting contextual and structural dimensions of organisation

(Source: Daft et al., 2017)

- Hierarchy of authority describes who reports to whom and the span of control for each manager. The hierarchy is related to span of control (the number of employees reporting to a supervisor). When spans of control are narrow, the hierarchy tends to be tall. When spans of control are wide, the hierarchy of authority will be shorter.
- Centralisation refers to the hierarchical level that has authority to make a decision. When decision making is kept at the top level, the organisation is centralized. When decisions are delegated to lower organizational levels, it is decentralized.
- Professionalism is the level of formal education and training of employees. Professionalism is considered high when employees require long periods of training to hold jobs in the organization. Professionalism is generally measured as the average number of years of education of employees.
- Personnel ratios refer to the deployment of people to various functions and departments. Personnel ratios include the administrative ratio, the clerical ratio, the professional staff ratio, and the ratio of indirect to direct labor employees.

Contextual dimensions

- Size can be measured for the organization as a whole or for specific components or division. Because organizations are social systems, size is typically measured by the number of employees.
- Organisational technology refers to the tools, techniques, and actions used to transform inputs into outputs. It concerns how the organisation actually produces the products and services it provides for customers and includes such things as flexible manufacturing, advanced information systems, and the Internet.
- The environment includes all elements outside the boundary of the organisation. Key elements include the industry, government,

customers, suppliers, and the financial community. The environmental elements that affect an organisation the most are often other organisations.

- The organisation's goals and strategy define the purpose and competitive techniques that set it apart from other organisations. Goals are often written down as an enduring statement of company intent. A strategy is the plan of action that describes resource allocation and activities for dealing with the environment and for reaching the organization's goals. Goals and strategies define the scope of operations and the relationship with employees, customers, and competitors.
- An organization's culture is the underlying set of key values, beliefs, understandings, and norms shared by employees. These underlying values and norms may pertain to ethical behavior, commitment to employees, efficiency, or customer service, and they provide the glue to hold organisation members together. An organisation's culture is unwritten but can be observed in its stories, slogans, ceremonies, dress, and office layout.

2.1.3 Contingency effectiveness approaches

In a system theory framework, top management role in organisational direction, design and effectiveness is shown in Figure 2.3. Normally, managers determine what indicators to measure in order to gauge the effectiveness of their organisation. However, effectiveness is a broad concept that evaluates the extent to which multiple goals, whether official or operative, are attained. Innovative organisations seek to improve its operation and performance effectiveness. Overall effectiveness can be measured based on the *Contingency Effectiveness Approaches* (Daft et al., 2017) that follows the Input-Process-Output (IPO) model of system analysis concept as shown in Figure 2.4

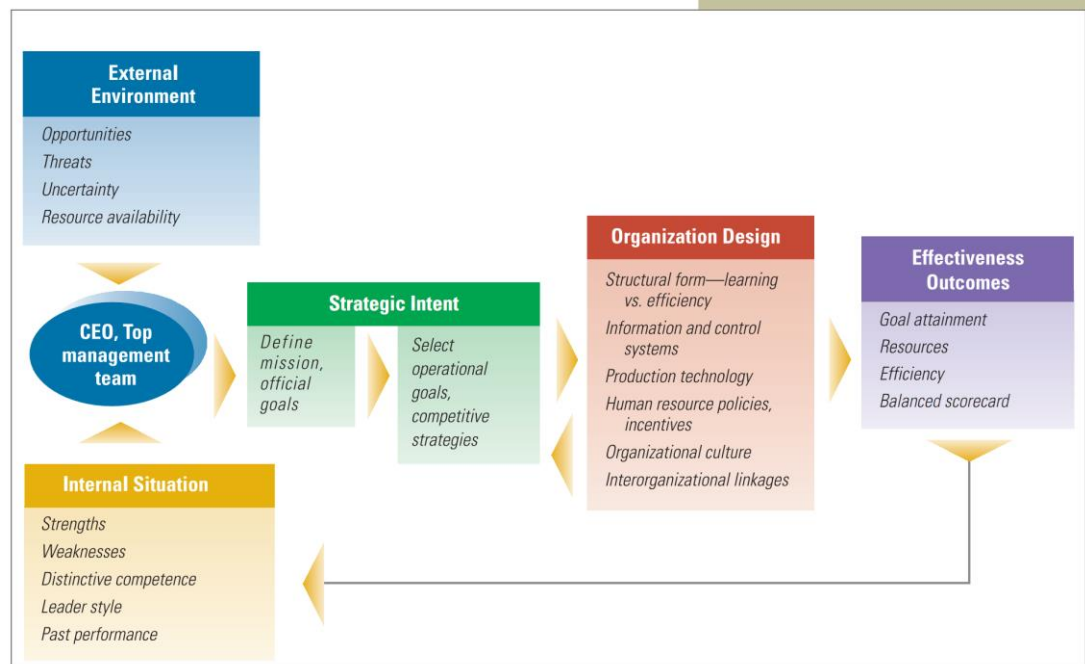


Figure 2.3: Top management role in organisational direction, design and effectiveness (Source: Daft et al., 2017).

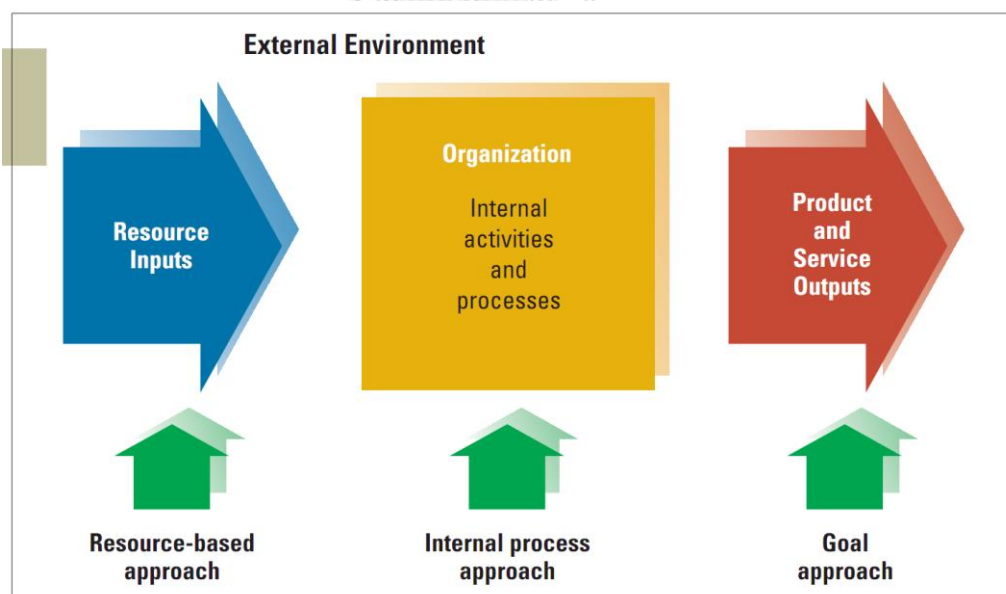


Figure 2.4: Contingency effectiveness approaches to measure organisational effectiveness (Source: Daft et al., 2017).

The *Contingency Effectiveness Approach* consists of the following three approaches that focus on different parts of an organisation.

Goal Effectiveness Approach – measures progress toward attainment of output goals. Since organisations have multiple and conflicting goals, effectiveness cannot be measured by a single indicator but must take into account several goals simultaneously.

Resource-Based Effectiveness Approach – is directed to the input side and assumes that organisations obtain and manage valued resources in order to be effective (Russo & Fouts, 1977 and Barney et al., 1998). Indicators of the Resource-Based Effectiveness Approach include:

- Ability to obtain from environmental scarce and valued resources such as financial resources, raw materials, human resources, knowledge and technology.
- Ability of the organisation decision makers to perceive and correctly interpret the salient properties of external environment.
- Abilities of managers to use tangible (e.g., supplies, people) and intangible (e.g., knowledge, corporate culture) resources in day-to-day organisational activities to achieve superior performance
- Ability of the organisation to respond to changes in the environment.

Internal Process Effectiveness Approach – is measured as internal organisational health and efficiency and closely linked to human resources in organisations (Argyris, 1964; Bennis, 1966; Likert, 1967; Beckhard, 1969) and culture (Ostroff & Schmitt, 1993; Frost et al., 1985). Cunningham (1977) proposed the following indicators based on the Internal Process Effectiveness approach:

- Strong, adaptive corporate culture, and positive work climate
- Team spirit, group royalty, and teamwork

- Confident, trust, and communication between workers and management
- Decision making near sources of information, regardless of where those sources are on the organisational chart.
- Operational efficiency, such as using minimal resources to achieve outcomes
- Undistorted horizontal and vertical communication
- Growth and development of employees
- Rewards to managers for performance, growth and development of subordinates, and for creation of cooperative work groups.

According to the definition of organisational innovativeness defined in this study, innovative organisation is effective in managing its goals, resources, and internal processes as seen via the Contingency Effectiveness Approach in organisation theory as described by Daft et al. (2017).

2.1.4 Organisational ambidexterity

Ambidexterity is the state of being equally adapted in the use of both left and right hand. Organisational ambidexterity refers to a phenomenon where organisations face the problems or tensions of two competing business concepts, operational models, or innovation management approaches such as mechanistic vs. organics, exploitation vs. exploration, flexibility vs. efficiency, alignment vs. adaptability, radical vs. incremental. The concept was first applied to managerial contradictions by Duncan (1976) and has since entered various streams of research in organisational design and business management (Nieto-Rodriguez, 2014). The characteristics of mechanistic vs. organic management approaches as described by Daft (2017) and Hatch & Cunliffe (2013) are compared in Table 2.2:

Table 2.2: Characteristics of mechanistic vs. Organic management approaches

| Mechanistic, Predictability, Accountability | Organic Flexible, Adaptability, Innovation |
|---|---|
| <ul style="list-style-type: none"> ▪ Tasks are broken down into specialized, separate parts. | <ul style="list-style-type: none"> ▪ Employees contribute to the common tasks of the department. |
| <ul style="list-style-type: none"> ▪ Tasks are rigidly defined. | <ul style="list-style-type: none"> ▪ Tasks are adjusted and redefined through employee teamwork. |
| <ul style="list-style-type: none"> ▪ Standardization through written rules, procedures, and standards operating procedures (SOPs). | <ul style="list-style-type: none"> ▪ Mutual adjustment and redefinition of tasks and methods through joint problem solving and interaction. |
| <ul style="list-style-type: none"> ▪ There is a strict hierarchy of authority and control; and there are many rules. | <ul style="list-style-type: none"> ▪ There is less hierarchy of authority and controls, and there are fewer rules. |
| <ul style="list-style-type: none"> ▪ Centralization: Knowledge and controls of tasks are centralized at the top of the organisation. | <ul style="list-style-type: none"> ▪ Decentralization: Knowledge and control of tasks are located anywhere in the organisation. |
| <ul style="list-style-type: none"> ▪ Communication is vertical (superior – subordinate) in the form of instructions. | <ul style="list-style-type: none"> ▪ Communication is horizontal. Often in the form of consultation between people from different departments. |

Burns and Stalker's contingency theory (1961) focuses on discovering what part of organisational factors contribute to organisational survival and success. The studies were conducted in the electronics industry and in R&D firms and concluded that mechanistic organisations outperformed organic organisation in stable environments, while in unstable environments, organic organisations were more successful (Hatch & Cunliffe, 2013).

As environmental uncertainty increases, organisations tend to become more organic, which means decentralising authority and responsibility to lower levels, encouraging employees to take care of problems by working directly with one another, encouraging teamwork and taking an informal approach to assigning tasks and responsibilities. Thus, the organisation becomes more fluid and is able to adapt

continually to changes in the external environment (Daft, 2017 and Courtright et al., 1989).

Organic organisational form of management promotes learning organisation (Hurst, 1995) that is known to encourage innovation and increase capability to innovate or innovativeness (Liao et al., 2008). The principle of learning organisation is for communication and collaboration to be actively promoted so that everyone is engaged in identifying and solving problems, enabling the organisation to continuously experiment, improve, and increase its capability. Hence, learning organisation is encouraged by equality, open information, little hierarchy, and a culture that promotes adaptability and participation (Daft et al, 2017). Problem solving is the essential value of learning organisation design as opposed to mechanistic organisational design for predictable outcomes and efficiency.

Exploitation vs. Exploration ambidexterity refers to an organisation's capability to exploit their existing competencies while simultaneously explore new opportunities. Exploitation refers to the use of existing knowledge and resources to reap value from what is already known e.g. refining procedures in order to do the same things more efficiently. Exploration is akin to rethinking knowledge and redeploying resources in previously unforeseen ways including searching for new options, experimenting, and conducting research, all of which represent organisational flexibility and create organisational changes (Hatch & Cunliffe, 2013 and March, 1991). Exploitation includes such things as choice, refinement, production, selection, execution efficiency and implementation, whilst exploration encompasses knowledge creation and analysis of future opportunities. Organisations that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation but without gaining many of its benefits. Conversely, organisations that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in stable equilibrium; going nowhere fast but efficiently (Nieto-Rodriguez, 2014). Therefore, innovative organisation need to maintain an appropriate balance between exploration and exploitation in order to stay ahead and remain competitive.

2.2 Innovation in public sector organisation

Public sector has been seen as a regulatory framework provider for innovation in private sector, as a passive recipient of innovation from private sector, and as conservative and bureaucratic. Research studies and innovation data collections and analysis in public sector are considerably fewer than in private firms (Bloch & Bugge, 2013). Innovation literature from various aspects mostly focus on private sector since innovation is seen as crucial alongside R&D based strategy to increase company bottom-line and business competitiveness.

Diverse literature on public sector innovation frameworks have been developed to guide the development and interpretation of many case studies on how public sector organisations, mostly in developed countries such as in Scandinavia, Europe, USA, Australia and other OECD member countries, are responding to the challenge to raise the level of innovation in the public sector. Although innovations in public sector can be difficult to conceptualised and measure, a lot of innovation measurement frameworks in public sector arise from the analysis of case studies in public service agencies (Osborne & Brown, 2013; Thenint, 2010 and Lekhi, 2007), characteristics of networked governance in public sector (Hartley, 2005), community governance (Hess & Adams, 2007), and collaborative innovation emphasising the public-private inter-linkages (Hipp, 2010). Theory of public sector innovation linking the three complex psychological factors of 1) individual motivation to innovate, 2) organisational culture, and 3) challenge of innovation has been developed and proposed by Glor (2001).

Innovation in public organisations differ from private enterprises mainly due to the difference in the purposes of public sector as non-profit seeking and gearing toward better service delivery to the public. Significant research studies from a management or entrepreneurial prospective on innovation in public organisations started since 1960s but the first study that directly examined innovation in the public sector was by Roessner (1977) in the study 'Incentives to innovate in public and private organisations'.

The recent academic interests on innovation in public sector is not because public sector is less innovative but due to rising expectations on the public sector to deliver better services and new policies to the society at lower costs and often in response to increasingly complex and cross-boundary issues. The advancement of information technology in the knowledge-based era coupled with budget constraints from economic slowdown in recent years add on the pressure to the public sector to be more efficiency and better adapted to fulfil their missions.

Comparison of innovation management in private sector vs. public sector is summarised in Table 2.3 below.

**Table 2.3: Comparison of innovation management
in Private sector vs. Public sector**

| Private Sector | Public Sector |
|--|---|
| Innovation for profit seeking purposes in order to remain more competitive than business rivals. | Innovation is for non-profit purposes to provide better public services and increase organisational performance. |
| Mainly focus on technological innovation to produce new products and services for the target market. | Mainly non-technological innovations to improve administrative operations and procedures. |
| Emphasis on market novelty of product or service innovation in order to increase production efficiency and productivity or to penetrate new market sections. | Emphasis on changes of bureaucratic behaviours and New Public Management concept to be more effective and businesslike. |
| Private sector innovation drives national and regional economy. | Public sector plays the regulator role supporting innovation development in private sector. |

2.2.1 Types of Innovations in Public Organisations

Windrum (2008) proposed the following types of innovations that occur in public organisations as shown in Table 2.4

Table 2.4: Types of innovations that occur in public sector as proposed by Windrum (2008)

| Innovation in public sector | Description |
|--|---|
| Service innovation | Introduction of a new service or an improvement to the quality of an existing service |
| Service delivery innovation | New or altered ways of supplying public services |
| Administrative and organisational innovation | Changes in organisational structures and routines |
| Conceptual innovation | Development of new views to challenge existing assumptions |
| Policy innovation | Changes to thinking or behavioral intentions |
| Systemic innovation | New or improved ways of interaction with other organisations and sources of knowledge |

There is no consensus on a definition of the term ‘organisational innovation’ as the exiting literature on organisational innovation is rather diverse and scattered (Lam, 2005). In general, organisational innovation or sometimes referred to as administrative innovation denotes the non-technological aspects of innovation that occurs in an organisation such as changes in the structure and processes of an organisation due to implementation of new managerial and working concepts and practices, supply chain management or quality management systems (OECD, 2005; Damanpour, 1987; Damanpour & Evan, 1984).

Organisational innovation in public agencies in this research is defined as *“the introduction, adoption, or implementation of a new idea, strategy, management practice, communication process or operational method, which results in a new development and improved outcome and performance within the organisation and may result in better service quality delivery or outcome that increases efficiency, policy*

effectiveness, and values to the society". This definition of organisational innovation is adapted from the definitions given by Innobarometer (2010): innovation is the implementation of a new or significantly improved service, communication method, process or organisational method; and by Albury (2005): innovation is the creation and implementation of new processes, products, services and methods of delivery, which result in significant improvements in outcomes efficiency, effectiveness or quality. It should be noted that the definition follows the Input-Process-Output (IPO) model on how innovation occurs based on the system analysis approach. The definition takes into account the fact that some innovations may result in an improved outcome within the organisation but may not necessarily always lead to better service delivery, policy effectiveness and values to the society. In addition, the impact of policy effectiveness and values to society is added to the definition because public organisations normally follow national government mandates in implementing their policies and regulations.

2.2.2 How public sector innovation has been measured

Although the impact of organisational innovation to improve competitiveness and performance especially in the private sector have been studied and analysed quite extensively during the last two decades (Caroli & Van Reenen, 2001; Damanpour et al., 1989; Greenan, 2003; and Piva & Vivarelli, 2002), there have been much fewer conceptual and methodological contributions to the monitoring and measuring of organisational innovations (Lam, 2005 and Armbruster et al., 2008). Most of the studies try to understand the factors and circumstances that trigger changes that lead to innovations in organisations but do not focus on the resulting status of the converted organisations when new administrations or practices have been implemented. This makes the attempt to measure and compare the effects of organisational innovations more difficult. Nevertheless, several developed economies in the OCED member countries have developed measurement frameworks to measure public sector organisational innovation and innovation related activities as described as follows:

The Korea Government Innovation Index (GII) is one of the early efforts of the government to measure public sector innovation and provides insights for the subsequent development of innovation index elsewhere. The Korea GII diagnosed the level of innovation via online web-based diagnostic system. Based on the results of the diagnostic, innovation strategies appropriate to the innovation levels and characteristics were recommended and implemented. Aside from innovation levels, government organisations can utilise the GII to identify key areas of weakness within the organization so that the organisation can begin to improve upon those areas. The government can view the overall results of the diagnostic to formulate and adjust innovation strategies for the entire government. The GII assesses leadership, organisational innovation capacity, and the extent of the attainment of innovation tasks using methods such as document reviews, surveys, on-the-site inspections and direct interviews with organisation heads (Yoon, 2006 and Kim et al., 2007).

The Nordic MEPIN (Measuring Public Innovation in the Nordic Countries) was a joint research collaboration in Nordic countries (Denmark, Sweden, Norway, Finland and Iceland) started in 2008 and completed in 2011. The objective of the MEPIN project was to develop a measurement framework for collecting internationally comparable data on innovation in the public sector. The survey was conducted among the public sector organisations at both central, regional and local levels in the five Nordic countries and included government institutions such as ministries and directorates, municipalities, schools and hospitals (Bloch, 2010 and Bloch, 2011). A common questionnaire was developed with similar approach to the Community Innovation Survey (CIS) which is mainly designed to measure innovation in the private sector across Europe. The framework focuses on innovation process started from (1) the objectives of the innovation that are shaped by rules and government policy, (2) inputs to innovation e.g. budgets, training, and competence, (3) innovation process e.g. organisation culture and interfaces, (4) outputs e.g. types of innovation that occur, and impact on organisation, and (5) outcome to society and economic (Bloch, 2013; Bloch, 2010; Mortensen, 2010; Jorgensen, 2010; Annerstedt & Bjorkbacka, 2010; and Bugge et al., 2011).

The UK Public Sector Innovation Index (PSII) was designed to accurately reflect how innovations happen in the public sector and to enable comparisons across agencies. The survey instrument was developed with the common guidance from the Oslo manual and the definitions of innovation were consistent with the European Community Innovation Survey (CIS) and the Nordic MEPIN Survey. There are four measurement dimensions in the UK PSII framework which are (1) Innovation Activity, (2) Innovation Capability, (3) Impact on Performance, and (4) Wider Sector Conditions for Innovation. The indices give scores based on a scale of 0-100% to these four factors. All the organisations participated in the survey received an individual organisation scorecard along with the overall findings to compare and benchmark their innovation index with peer organisations (NESTA, 2011; CFA & DAMVAD, 2009; Deloitte, 2009; Ernst & Young, 2009; and The Innovation Unit, 2009).

The Australia Public Sector Innovation Index (PSII) was developed to measure and report innovation capacity and performance of the Australia public service and wider public sector. The online Public Sector Innovation Toolkit was developed in 2011 by the Department of Innovation Industry Science and Research (DIISR) and the Australian Government Information Management Office as an online resource centre to help individuals measure and evaluate innovation in their organisations. The full survey was launched in 2012 with responses from 473 individuals from 83 public agencies. In the APSII framework, indicators are used to measure organisation innovation performance and capacity by identifying innovation activities, impact of innovation, staff innovation potential, innovation management practices, innovation culture and leadership, agency innovation strategy, and innovation barriers and drivers both internal and external (DIISR, April 2011a; DIISR June 2011b; and DIISR June 2011c).

The European Public Sector Innovation Scoreboard (PSIS) was the first EU wide attempt to develop a common tool to measure and benchmark innovation in the public sector. As an initial step, the Innobarometer survey consisting of 24 questions was conducted in 2010 targeted over 4,000 public organisations from across the 27 EU member states. The EPSIS consists of three factors of innovation enablers, activities, and outputs, and together forms 7 dimensions, and 22 indicators for measurement. The innovation enablers consist of two dimensions of human resources and quality of public

service, innovation activities consist of two dimensions of capabilities and drivers and barriers, and outputs consist of three dimensions of innovators, effects on business performance, and government procurement. The 22 indicators are used to create a scorecard showing the relative strengths and weaknesses of a particular EU member country. However, due to a different nature of each indicator, from which some are based on hard statistical data, while others are based on soft (opinion-based) data, the scorecard cannot be used to evaluate and compare the overall relative performance of the responding countries. The scorecard methodology can only be effectively applied for evaluation of individual indicators, thus allowing the users to identify and compare particular dimensions where performance could potentially be improved (EPSIS, 2013 and Technopolis Group, 2011- 2013)

These public sector innovation measurement frameworks were all originated from the central governments' political will to benchmark and compare innovation capacity and performance of their public agencies across nationwide (Korea GII, UK PSII, and Australia PSII) and regionally (Nordic MEPIN and EU PSIS). Common factors include internal infrastructure support system and resources, management practices and capabilities, external conditions and contexts, and efforts to quantify some psychometric features of leadership characters and organisation culture. These projects require intensive manpower and funding resources over a few years. The use of in-depth interviews along with open-ended questionnaires can provide advantages in gaining more detailed quantitative and objective data for analysis and comparison. However, this method may not be suitable in an early phase of organisational innovativeness assessment without prior formal commitments and political supports from the governments and the participating respondent organisations.

2.3 Organisational innovativeness

One of the objectives of this research project is to identify, measure, and assess the factors and characteristics that all together encompass the overall's organisational innovativeness of public agencies. In accordance with the previously mentioned definition of public sector innovation, public organisational innovativeness in this study is defined as *“the overall tendency and capability of the public organisation to introduce and support innovative activities, processes, practices, and cultures that improve its operation, performance, effectiveness, efficiency or competitiveness”*. The innovative activities, practices, and cultures are introduced, practiced, and managed by the organisation leaders, executives, management teams, and employees within the organisation. However, the sources of the innovative ideas and practices may also come from outside the organisation via top-down government policy initiatives, demands from the citizen or users of the services provided by the organisation, and formal and informal interactions and collaborations with other agencies from the public, private and academic sectors within the same country or internationally.

In a resource-based theory, organisational capability refers to the ability of an organisation to manage and expressed its (1) human resources: their number, quality, skills, and experience, (2) physical and material resources: machines, land, buildings, (3) financial resources: money and credit, (4) information resources: pool of knowledge, databases, and (5) intellectual resources: copyrights, designs, patents, etc. (businessdictionary.com). The effective management of any organisation requires the ability to coordination of an array of internal organisational processes, routines and activities or organisational capability (Andrew et al., 2015 and Schreyögg & Kliesch-Eberl, 2007). Organisational capability is essentially constituted by the high-level organisational practices used to coordinate the productive activities of the organisation (Winter 2003). The organisational capability and practices are further explored under the proposed factors affecting public organisational innovativeness in this study.

Both definitions of organisational innovation and organisational innovativeness emphasize the new public management (NPM) concept first introduced by Hood (1991) of increasing service quality and efficiency (Bekker et al., 2011) and also encompass the new paradigm shift towards public value governance (Bryson et al., 2014, and Hammer, 2016) focusing on performance driven by creating and delivering public value in a networked environment of coordination and collaboration with other organisations in the system of innovation.

New Public Management (NPM) approach to foster innovation by Pollitt (2003, pp. 27–28) identifies the following key elements of NPM:

- A shift in values and priorities away from universalism, equity, security and resilience towards efficiency and individualism, defining the role of a citizen as a ‘homo economicus’
- A shift in the focus of management systems from inputs and processes towards results and outputs
- A shift towards measurement and quantification, especially through the development of performance indicators and benchmarking systems
- A preference for more specialized, ‘lean’, ‘flat’ and autonomous organisational structures
- A substitution of formal, hierarchical relationships between or within organizations by contracts or contract-like relationships
- A much wider deployment of markets or market-type mechanisms for the delivery of public services
- An emphasis on service quality and a consumer orientation
- A broadening and blurring of the frontiers between the public sector, the market sector and the so-called third or non-profit sector.

2.3.1 Organisation innovation vs. Innovativeness

In contrast to innovation, organisational innovativeness considers multiple management and non-technological innovation related activities, emphasising organisational characteristics rather than specific innovation attributes (Damanpour, 1992). Kamaruddeen et al. (2010) concluded from their study that innovation seems to incorporate the adoption and/or implementation of new defined activities rather in subjective ways, whereas innovativeness normally embodies some kind of measurement contingent on an organisation's propensity towards innovation. In general, innovation must have occurred for an organisation to be considered innovative. However, for innovation to occur, the organisation must possess certain traits or characteristics that are conducive to innovation. Therefore, in this case innovativeness is antecedent to innovation.

Organisational innovativeness is linked to effectiveness (evaluation the extent to which multiple goals are attained) and efficiency (amount of resources used to produce a unit of output) and can be assessed based on the Contingency Effectiveness Approaches (Daft et al, 2017) that focus on (1) the goal approach that measures progress toward attainment of output goals, (2) resource based approach that is directed to the input side of the Input-Process-Output (IPO) model and assumes that organisations obtain and manage resources in order to be effective, and (3) internal process approach in which effectiveness is measured as internal processes of organisational efficiency in terms of smooth operational process.

Andrews et al. (2015) argued that fostering innovation is less a matter of successfully implementing innovation processes but rather a matter of improving innovativeness or innovation capability. Organisation innovation and innovativeness are underpinned by the organisational ambidexterity of the nested paradox between exploitation and exploration. Exploitation refers to processing and refining the core operation and production for efficiency and exploration refers to prospecting activities for new opportunities and innovation (Boukamel & Emery, 2017; and March, 1991).

In the study on the evolution of organisational ambidexterity in the public sector and current challenges for innovation capabilities by Boukamel & Emery (2017), the authors concluded that the current research on public sector innovation has now shifted from focusing on improving public service delivery, incentives and barriers of innovation, and innovation processes towards tendency to innovate or improving innovation capability, which is the main concept and definition of innovativeness in this study. Hence, this research project, studying factors affecting public sector organisational innovativeness and developing a web-based application to measure organisational innovativeness of public agencies, pursues the most up to date research efforts and the latest focus on public sector innovation management research.

According to Boukamel & Emery (2017), public sector innovation and innovation capability (or innovativeness definition in this study) can be separated into three main periods based on the perception of innovation and the characteristics of public administration and management.

The first period of public sector innovation up to the 1970s is the *Bureaucratic Period* that emphasized the bureaucratic model of public sector innovation with most of the research studies devoted to public service delivery. The traditional model of bureaucracy is rooted in the work of Max Weber (1956). According to Weber, a public administration must rely on principles such as hierarchy, formal rules, uniformity, legitimacy, and standardization of procedures, division of labour, impersonality, meritocracy and technical qualifications (Lampropoulou & Oikonomou, 2016). These values were applied in every public administration in western countries up to the 1970s. This was a paradigm of rationalization and was afterwards called the traditional model of public administration (Peters & Pierre, 1998; Dunleavy & Hood, 1994). This mechanistic approach emphasized the need for the clarification of goals and the rationalization of processes (De Boer, Enders & Leisyte, 2007). Among others, the rational goal approach (during the first quarter of the twentieth century) and the so-called internal process model, which stresses the importance of continuity and stability, (Quinn et al., 2014) were classical approaches that are also impregnated by juridical and industrial approaches, and thus called for more standardization of production in administrative and clerical activities (Quinn et al., 2014; Abu, 1994). During this

period, innovation in society was mainly the prerogative of business. The early works of Schumpeter (1935) show how important innovation was for firms, as survival and success within a competitive market was at stake. Indeed, Schumpeter clearly demonstrates that a country's economic growth depends on the innovativeness of its firms. Thus, the role of the state vis-à-vis innovation was, at that time, to provide the means and freedom to innovate and reinvent the domestic economy. This included massive investment in national scientific research, in the education of the workforce and in infrastructure (Sorensen, 2017). For Kattel (2015), during the Schumpeterian period the role of the public sector in entrepreneurial innovation is twofold: first, the public sector can take on the role of the entrepreneur e.g. in socialist countries, and second, innovations in business can also be called forth by governments. During this first evolutionary period, public sector innovations were oriented towards bureaucracy approaches within rigidity and legality frameworks. In addition, innovative behaviours of managers and civil servants within public sector organisations were at best controlled and could even be considered as a kind of disobedience. This was the period in which public servants were not involved in innovation within their organisations, and nor were citizens, who could only put innovative ideas onto the agenda through the election of politicians but had little participation.

The second period of public sector innovation from 1970s to 2000 is *Managerial Period* characterised by the general perception that public sector organisations should reinvent themselves in order to effectively support innovation in private sector (Osborne & Gaebler, 1993) and the idea of innovation within the public sector gradually started to emerge in public administration agenda (Borins, 2006; and Osborne & Brown, 2011). New public management (NPM) Hood (1991) was introduced in many countries to improve public service quality (Pollitt & Hupe, 2011) and to replace Weber (1956)'s bureaucratic model that was criticized for encouraging public servants to be overly oriented towards procedures, while neglecting the original goals of their administration to serve the public (Merton, 1957). Rigidity of task definition, which is one of the characteristics of the bureaucratic model, certainly weakens communication within the organisation hierarchy (Crozier, 1980; and Crozier, 1963). The NPM model brought private sector values and goals such as efficiency,

performance, and cost and audit orientation to the public sector along with private firm managerial practices (Diefenbach, 2009). According to Arundel et al. (2015), NPM was adopted in the public sector partly to give managers greater responsibility for implementing efficiency- enhancing innovations but also to make them manage. The NPM paradigm placed innovation as one of the central goals of public sector agencies. The pull factors towards public sector innovation include the progress in ICTs that made new operations possible and more efficient. The push factors or the constraints that put pressure on public sector organisations and force them to change, which lead to the second era of *Managerial period* of public sector innovation include:

- The budgetary cuts and downsizing exercises that have taken place since that period (Albury, 2005);
- An increase in citizens' expectations with respect to public administrations (Bason, 2010), including in relation to quality of service, customer orientation, responsiveness, etc;
- The obsolescence of the one size fits all model, and a need for service customization (Mulgan & Albury, 2003);
- Public sector organisations are not being attractive to potential employees (Emery, 2003);
- A deficient institutional legitimacy, partly caused by a lack of transparency and accountability (Fung & Wright, 2001; Hartley, 2005);
- New needs, in terms of inter-organizational cooperation, to deal with the growing numbers of wicked problems (Head & Alford, 2013) that it is difficult to solve without national and even international cooperation (climate change, tax policies, criminality, ecology, migration, etc.) (Sorensen & Torfing, 2012); and
- The necessity to adopt modern information and data management tools and methods (Rosenberg & Feldman, 2008).

Public sector innovation in the second *Managerial period* up to early 21st century was still mainly led and implemented by policy makers in a top-down fashion, while civil servants and citizens continued to be partly excluded from the innovation decision processes (Hartley, 2005). This period also witnessed the growing involvement of external consultants in public sector innovation initiatives due to the lack of internal competency of public servants to innovate (Hood & Jackson, 1991; and Lapsley & Oldfield, 2001). The planning model of innovation, strongly inspired by the rational planning model, has been widely applied in the public sector (Boyne et al., 2004). According to the logic of this model, a public sector organisation must manage innovation as a standardized process, following precise steps such as clarifying and quantifying objectives, auditing the environment and the organisation, generating policy options, selecting the best option, controlling implementation, and monitoring results (Boyne et al., 2004). Furthermore, this period is characterized by what can be called a classical R&D approach to innovation in public policies. In line with the specialization of public sector innovation activities in this period, the first decade of the twenty-first century witnessed the gradual emergence of public sector innovation think tanks. These innovation labs or policy labs are meant to bring new ideas and approaches to policy making (Wyden et al., 2016). At the organisational level, other types of innovative activities could emerge from a standardized framework, as proposed by the International Organization for Standardization (ISO) system and total quality management (TQM) initiatives (Emery, 2009), mainly through continuous improvement processes or plan-do-check-act Deming cycle.

The third period of public sector innovation from early 21st century to present can be call the *post-NPM* or *towards innovative public organisation*. According to Boukamel & Emery (2017), we are witnessing a second paradigm shift from innovation to improve efficiency and performance to why and how a public sector organisation should innovate. This is because innovation goals (why an organisation should innovate) and innovation processes (how an organisation should innovate) have become more diverse as public sector innovation benefits from a broader view of the importance of the characteristics of innovative organisations or organisational innovativeness (De Vries et al., 2015). Public sector organisations are not only seeking

to implement successful sporadic innovations but also to develop sustainable innovation capabilities.

While an innovation can be implemented through standard top-down processes and classical organisational units devoted to R&D (as was previously the case), innovation capability, or the organisational ability continuously to generate and implement innovations, rests on the existence of collective initiatives supported by individual innovative work behaviours (e.g. opportunity exploration, idea generation, etc.) at all levels of the hierarchy (Moll & de Leede, 2017). Even if the rates are questionable, Getz & Robinson (2003) assert that in practice 80% of improvement ideas come from employees and only 20% come through planned improvement activities.

Research on public sector innovation is multidisciplinary and can be found in various topics such as of public administration, strategic management, sociology etc. Many studies have recently focused on the conditions for (Daglio et al., 2015) or antecedents of (DiMaggio & Powell, 1991; and Meyer & Hammerschmid, 2006) innovation in public sector organisations. Factors that have been found to affect public organisational innovation capabilities are organisational slack, openness to bottom-up initiatives, more flexible work arrangements, greater involvement by different actors, and an ability to overcome inter-organisational borders:

Organisational slack refers to organisational flexibility towards the use of resources (Adkins, 2005). According to Behn (1988) and other scholars like Golden (1990), public sector organisation innovation capabilities are stimulated when professionals use an experimental process of groping towards goals that are loosely defined (Borins, 2001) rather than when they work on carefully planned innovation initiatives. Therefore, the development of innovation capabilities is built on organisational slack, and it is notable that this was eliminated during the NPM period.

The dominant top-down planning approach of NPM was able to generate innovations, but its effectiveness is contested by numerous studies (Golden, 1990). According to Sorensen & Torfing (2016), hierarchically organised public bureaucracies tend to produce innovations in-house and thus fail to tap into the experiences, resources, knowledge and ideas of relevant and affected actors. Besides, NPM discouraged

knowledge sharing across organisations and consequently acted to hinder some types of innovations (Arundel et al., 2015) introducing the arguments of Hartley et al., (2005). Thus, the innovation capabilities of public sector organisations are partly the result of their openness to bottom-up initiatives.

At the managerial level, public sector organisation innovation capabilities rely on flexible work arrangements that empower public servants by stimulating innovative work behaviours. Moll & de Leede (2017) show how the new way of working, a work design with flexible work space and time arrangements, may promote employees' innovative behaviours such as idea emergence and opportunity exploration.

In addition, the development of innovation capabilities relies on the public sector organisation's ability to involve a large, complex and multi-layered network of internal and external actors, and sometimes also other organisations, in its innovation projects (Armbruster et al., 2008; and Camisón & Villar-López, 2014). Such networks are characterized by having no clear management structure or leadership (Lewis & Ricard, 2014; and Varone, et al., 2016). Often, numerous and varied stakeholders are engaged in the activities of a public sector organization, and this has inconsistent implications for innovation processes. Stakeholders can either be continuously consulted during a specific phase of the innovation project or, by contrast, may be closely involved during the whole project, as co-actors in public policies (Boyle et al., 2010). This enlargement leads to a fragmentation of the space of innovation towards an ecology of actors (Dougherty & Dunne, 2011; and Touati et al., 2016), who are involved in complex networks (Rhodes, 2013), collaborative innovation (Sorensen & Torfing, 2011; and Torfing, 2016) or innovation systems (Kinder, 2013).

Furthermore, innovation capability is based on the public sector organisation's ability to break out of administrative silos. This inter-organisational dimension can be significant, since many institutional actors might be (mandatorily or optionally) involved in the project. Inter-organisational cooperation is also required since contemporary public problems are highly complex and wicked (Head & Alford, 2013). This inter-organizational dimension is all the more important in the public sector because citizens' expectations are often very varied and, in a way, integrated. For instance, an individual who moves to a neighbouring municipality requires services

from different schools, tax administrations or health centres simultaneously (Kinder, 2003). Inter-organisational cooperation is often hard to achieve because institutional boundaries (and related practices, sub-cultures, etc.) can be extremely strong (Michaux, 2010).

The summary of Boukamel & Emery (2017) three periods of public sector innovation and their characteristics is shown in Table 2.5.



Table 2.5: Three periods of public sector innovation and their characteristics proposed by Boukamel & Emery (2017)

| | Bureaucratic period (up to the 1970s) | Managerial period (from the 1970s to around 2000) | Post-NPM period (from the first decade of the 21st century) |
|--|--|---|---|
| Main characteristics of the period | | | |
| Innovation perception | No need | PSOs need to innovate | PSOs need to be innovative |
| Dominant paradigm | Classical bureaucracy | Managerial approaches | Post-managerial approaches Open governance |
| Fields of influence | Juridical and industrial | Business | Multidisciplinary |
| Dominant values | Hierarchy, uniformity, legitimacy, rules | Efficiency, effectiveness, performance | Public value, democracy, transparency, accountability |
| Main barriers | Bureaucratic rigidity | Silos, procedural constraints, resources, lack of organizational slack and of flexibility | Uncertain transition towards contextual ambidexterity |
| Key actors in public administration and public sector innovation | | | |
| Political actors | Legislative innovations | Legislative innovations | Legislative innovations, inter-organizational cooperation |
| PSO managers | Little room for implementation, dedicated to public service delivery | Autonomy to innovate within their own unit | Autonomy to innovate, ability to stimulate stakeholders to innovate, development of innovation capabilities |
| Front-line bureaucrats | Public service delivery only | Public service delivery only, partly involved in innovations | Public service delivery and innovation activities |
| Citizens | Passive users | User–customers | Users, customers and co-creators of public services |
| Ambidexterity and resulting challenges | | | |
| Main trends of ambidexterity in PSO as deduced from the literature | 1. Little ambidexterity, mostly exploitation | 1. Little ambidexterity, mostly exploitation 2. Tendency to adopt structural ambidexterity | 1. Little ambidexterity, mostly exploitation 2. Tendency to adopt structural ambidexterity 3. Difficult transition towards contextual ambidexterity |
| Resulting challenges of the models of ambidexterity for innovation capabilities | 1. Inertia due to the tendency to favour exploitation | 1. Inertia due to the tendency to favour exploitation 2. Barriers to knowledge sharing and innovation diffusion; silo functioning due to the lack of integration | 1. Inertia due to the tendency to favour exploitation 2. Barriers to knowledge sharing and innovation diffusion; silo functioning due to the lack of integration 3. Inadequate culture and structure for innovation capabilities due to the incomplete transition to contextual ambidexterity |

2.3.2 How organisational innovativeness has been measured

The following research articles were reviewed and summarised for their contributions in the topics of measuring organisational innovativeness and discussing the relevant factors in the organisational innovativeness measurement framework models.

Open2-Innovation tool is an online web-based tool for rating organisational innovation performance along with measuring users' personal innovativeness. It is publicly freely available to access at <http://mcs.open.ac.uk/itool/>. It was developed to support Open University (OU) work on the U-STIR (User-Driven Stimulation of Radical Technological Steps in Surface Transport) project funded by the EU Framework 7 initiative and involves partners from Austria, Bulgaria, Italy, Spain, Germany, France and the UK (Caird et al., 2013). The tool was designed to be used as a starting point for users to empirically measure their organisation's innovation performance. The user is invited to respond to 28 statements by selecting a response to a statement from the three options of "tend to agree", "tend to disagree", and "don't know". The tool takes about five minutes to complete. The questions are classified in terms of the key indicators of innovation performance, namely: (1) enablers (human resources, finance, and organisational resources for innovation), (2) organisational activities (investments and expenditures to support innovation activities; connections established between organisations, disciplines, and users; and intellectual property (IP) generation), and (3) performance outputs (innovation introductions, resource efficiency innovation, valuable IP, and economic effects). The tool also includes a self-rating of personal innovativeness to explore the congruence between the user and their organisation. The overall rating of organisational innovation performance is given as feedback together with the three component ratings and the personal innovativeness.

Wang & Ahmed (2004) developed and validated organisational innovativeness construct based on confirmatory factor analysis with 5 areas of innovativeness dimensions, which are (1) product innovativeness: measures the novelty of new product introduced to the market at a timely fashion, (2) market innovativeness: newness of approaches that companies adopt to enter and exploit the targeted market, (3) process innovativeness: introduction of new production methods, new management

approaches, and new technology that can be used to improve production and management processes, (4) behavioural innovativeness: sustained behavioural change of the organisation toward innovations demonstrated through individuals, teams and management, and (5) strategic innovativeness: development of new competitive strategies that create value for the firm. All the five dimensions are inter-linked and together initially form a 29 item statements in the questionnaire with a seven-point Likert scale. After the scale validation and factor analysis, a 20 item statement model is adopted and this measurement framework construct has been widely accepted and cited to by subsequent studies of other researchers measuring organisational innovativeness (cited by 827 references so far according to emeraldinsight.com).

Moo et al. (2010) reviewed 12 journals and 56 articles to compare models for measuring organisational innovativeness in private firms and suggested three patterns for measuring innovativeness: (1) innovation adoption vs. innovation creation, (2) innovation type of product/ service vs. process, and (3) input-oriented vs. output-oriented measurement. The authors concluded from the literature reviews that there are a variety of concepts for capturing innovativeness which are not consistent in how they are measured depending on the underlying theory used by various studies. The authors suggest using the combination of both input (such as resources, infrastructure, management support, strategy, knowledge management, attitude toward risks, eagerness, creativity) and output (capturing the results of innovativeness in terms of number of new products, patents, impact of new products on company's profit) to measure innovativeness.

Skerlavaj et al. (2010) proposed and empirically test a model of organisational innovative improvement based on the impact of organisational learning culture in 201 South Korea firms employing more than 50 people in various industries. Organisational learning culture is defined as a set of norms and values about the functioning of an organisation based on the learning process of information acquisition, information interpretation, and behavioural and cognitive changes. The authors view organisational culture as competing value framework in a two-dimensional scale of flexibility vs. control orientation and activities occurring within vs. outside the organisation (Denison & Spreitzer, 1991, and McDermott & Stock, 1999). The

organisational learning culture is measured via Skerlavaj et al. (2007) instrument with three constructs and 42 items on five-point Likert scales. The innovativeness measurement items are from Daft (1982), Tsai (1997), Wang & Ahmed (2004), and Liao et al. (2008) and the innovative culture measurement items are from Hurley & Hult (1998). The authors concluded that organisational learning culture has an impact on innovativeness and on technical and administrative innovations. Learning culture can result in maximizing the capability of innovation in high performance organisation.

Walsh et al. (2009) proposed that the defining factor of long-term survival through innovation appears based not on specific, discrete innovations but rather on an overarching, organisation-wide innovation capability structure that is termed “innovativeness”. Innovativeness has been frequently used interchangeably with innovation (Wang & Ahmed, 2004; Salavou, 2004; Hurley & Hult, 1998; Subramanian & Nilakanta, 1996). This is despite a general consensus in the literature that innovativeness is the precursor to innovation and represents an organisation’s ability to innovate (e.g., Wang & Ahmed, 2004; Hult et al. 2004; Hurley & Hult, 1998; Avlonitis et al. 1994).

Lynch et al. (2010) reviewed various definitions of innovativeness stating that Hurt et al. (1977) was one of the earliest researcher to define innovativeness as “willingness to change” and discussed other definitions by subsequent authors include “capacity and behavioural willingness to innovate” (Avlonitis et al., 1994), and “capacity to introduce new processes, products, or ideas in the organisation” (Hult et al., 2004). The authors then proposed five key dimensions of organisational innovativeness namely, creativity, openness to new ideas, intention to innovate, willingness for risk-taking, and technological capacity to innovate to address the issue of setting strategic goal toward innovativeness to raise competitiveness of firms in tourism industry.

Onag et al. (2014) initially identified 11 dimensions of organisational learning capabilities and developed a measurement scale with 50 item statements and validated it with the organisational innovativeness scale developed by Wang & Ahmed (2004) using 143 completed questionnaires. The data collection was carried out at Manisa Chamber of Commerce and Industry’s committee member firms from various

industries such as construction, manufacturing and services in Turkey. After the factor analysis, 7 factors with 34 items were included in the final model. The seven factors are (1) knowledge sharing, (2) dialogue, (3) participative decision making, (4) managerial commitment, (5) experimentation and openness, (6) knowledge transfer, and (7) risk taking. The authors concluded that high organisational learning capability correlates to greater degree of organisational innovativeness.

Suwannathat et al. (2012) and Suwannathat et al. (2015) designed a performance measurement system to measure innovation in public organisations in Thailand based on Thailand's Public Management Quality Award (PMQA) developed by the Office of the Public Sector Development Commission (OPDC) in 2005. The performance measurement system initially consists of 8 constructs namely, (1) primary or initiation factors (culture), (2) external orientation factors, (3) strategic orientation, (4) organisational structure and boundaries, (5) essential skills for public offices, (6) essential resources in public organisation conducive to innovation, (7) factors associated with support mechanism, and (8) performance evaluation. The survey was conducted among 112 public organisations in which 38 organisations had won the award for service innovation from OPDC. After the statistical factor analysis, factor number (5) and (6) were combined together to form one factor of asset and capabilities. However, the authors did not provide details of the item statements used and proposed four different models of the causal influences of the revised seven latent variables to innovation. The authors also concluded from the findings that culture and external linkages factors have positive impact on innovation and service delivery.

2.4 Conceptual framework models of Public Organisational Innovativeness

Tool (POINT)

In this study, based on extensive literature reviews on how public sector innovations occur and are measure and factors affecting organisational innovativeness, the conceptual framework models of Public Organisational Innovativeness Tool (POINT) can be separated into two models of measurement framework (Figure 2.5) and structural relationship framework (Figure 2.6) that consist of the proposed eight factors of F1: Culture, F2: Leadership, F3: Strategy, F4: Workforce, F5: Resources and infrastructure, F6: Management, F7: Performance, and F8: Networks.

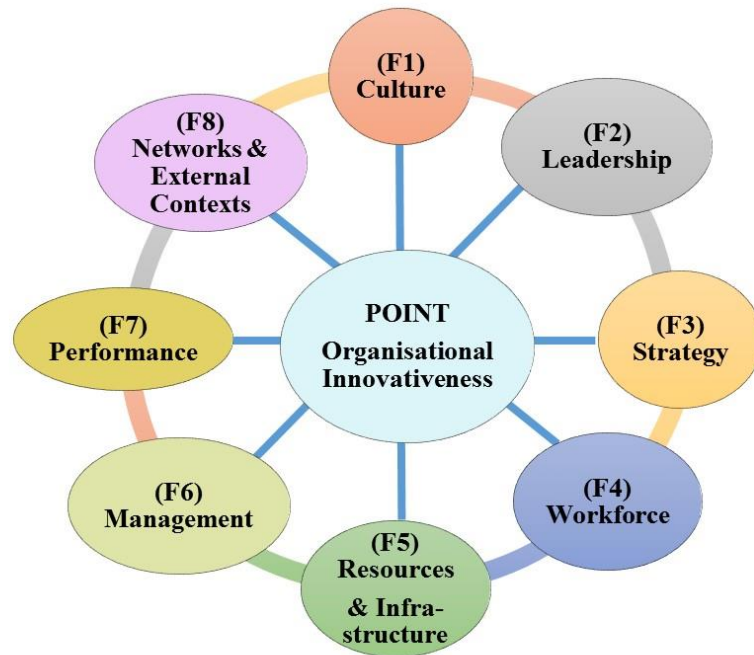


Figure 2.5: Measurement framework model of Public Organisational Innovativeness Tool (POINT)

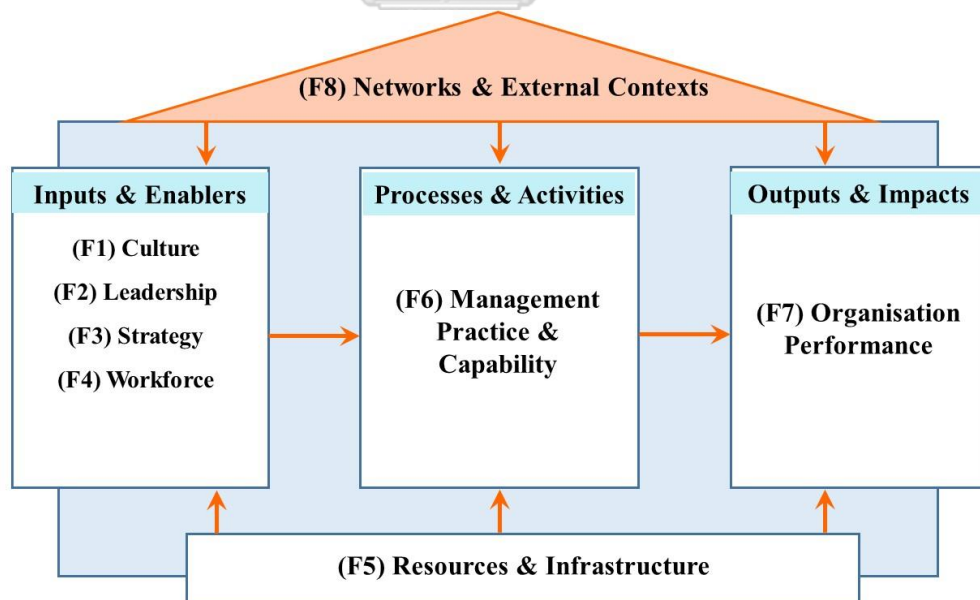


Figure 2.6: Structural relationship model of Public Organisational Innovativeness Tool (POINT)

The proposed eight POINT factors were in analogy with Thailand PQMA (Public Quality Management Award) (Wipulanusat & Sunkpho, 2013) that was developed based on the USA Malcolm Baldrige National Quality Management (MBNQA) concept (Baldrige National Quality Program, 2005, Lee & Ooi, 2015). The PMQA Criteria can be used as a tool for self-assessment, and are widely accepted as an integrated framework for organisation development. PQMA consists of 7 variables namely 1) Leadership, 2) Strategic planning, 3) Client and stakeholder focus, 4) Measurement, analysis, and knowledge management, 5) Human resources focus, 6) Process management, and 7) Performance results.

In Figure 2.5: POINT measurement framework model, the hypotheses are that the organisational innovativeness construct consists of these eight distinct multidimensional components that are correlated and interlinked to one another and that the covariance among all of the item statements can be accounted for by a single overall organisational innovativeness factor or POINT score. The proposed measurement framework model of POINT is consistent with the development and validation of the organisational innovativeness construct using confirmatory factor analysis proposed by Wang & Ahmed (2004) which is one of the most widely accepted organisational innovativeness constructs and has been cited to by subsequent studies of other researchers measuring organisational innovativeness (cited by 827 references so far according to emeraldinsight.com).

In Figure 2.6: The proposed structural relationship framework model (causal or path model) of the eight factors of POINT is shown in Figure 2.6. The proposed structural relationship model of POINT in this study follows the input-process-output (I-P-O) of the system analysis concept similar to the Contingency Effectiveness Approaches by Daft et al., 2017 as well as how public sector innovation was measured in the previous frameworks developed by the Nordic MEPIN survey (CFA and DAMVAD, 2009; Bloch, 2013; Bloch, 2010; Mortensen, 2010; Jorgensen, 2010; Annerstedt & Bjorkbacka, 2010; and Bugge et al., 2011), and organisational innovativeness assessment from the Open2-Innovation web-based tool (Caird et al., 2013).

Following the I-P-O of the system analysis concept and the Contingency Effectiveness approach, the hypotheses are that F1: Culture, F2: Leadership, F3: Strategy, and F4: Workforce innovativeness factors together form the inputs & enablers factors affecting innovation activities at the start of the innovation process, whilst F7: Performance innovativeness is in the outputs and impacts factors resulting from the innovation related activities of the organisation. F6: Management innovativeness is the moderator between the inputs and outputs of the innovation process, whilst F5: Resources and infrastructure and F8: Networks and external contexts innovativeness factors can affect innovation processes along all the stages of the I-P-O system.

2.4.1 Descriptions and definitions of POINT factors and sub-factors

In this section, the descriptions and definitions of the 8 factors and 20 sub-factors are proposed and relevant referenced research studies are discussed.

Factor 1: Culture innovativeness is the organisational norms and climates that encourage innovation, communication, and improves performance and competitiveness. The cultures that are believed to foster innovation include creativity, openness, risk taking, failure tolerance, willingness and adaptability to change and challenges, organisational learning, and knowledge sharing (Ruvio et al., 2013; Martins & Terblanche, 2003; and Ginevičius & Vaitkūnaite, 2006). Innovative culture serves as a catalyst of innovations, while lacking it acts as blocker of innovations (Wang & Ahmed, 2004). Culture innovativeness is the organisational norms and climates that encourage innovation, communication, and improves performance. Within F1 culture innovativeness, 4 sub-factors are proposed namely *IN01: creativity*, *IN02: openness*, *IN03: risk taking and failure tolerance*, and *IN04: new public management (NPM) values and governance*. The organisational learning and knowledge sharing factors are included under the management practice in management innovativeness since knowledge management is normally one of the functions of the management unit within the organisation.

IN01: Creativity refers to the organisation cultural aspect that values and constantly initiates and seeks new ideas, new knowledge, new concepts, and new methods to improve existing practices or solve problems (Ruvio et al. 2013).

IN02: Openness refers to the organisation cultural aspect that is open-minded to new ways of doing things and responsive to changes. Open communication channels are readily available among top executives and employees across different divisions within the organisation.

IN03: Risk taking and failure tolerance refers to the organisation cultural aspect that makes full use of new ideas as the best course of action available and encourage testing of new concepts even knowing that they might fail in order to improve the organisation performance.

IN04: NPM values and governance refers to a new point of view towards the public organisational design and management to be more business-like, less bureaucratic, and more efficient to service the society. At the ASEAN level, the concept of NPM is also emphasized in promoting good governance practice under the article A.1.4 in the ASEAN Political-Security Community (APSC) Blueprint (ASEAN International Conference on Governance Efficiency in ASEAN, Bangkok, Thailand, 2014).

Martins and Terblanche (2003) presented the determinants of organisational cultures that influence creativity and innovation based on the open systems theory by Schein (1985). The five determinants are strategy, structure, support mechanisms, behaviour that encourages innovation, and open communication. Organisational culture is defined as the deeply seated (often subconscious) values and beliefs shared by personnel in an organisation and is manifested in the typical characteristics of the organisation. The components of routine behaviours, norms, values, philosophy, rules of the game and feelings all form part of organisation culture (Hellriegel et al., 1998; Smit & Cronje, 1992).

Ruvio, et al. (2013) viewed conceptualised organisational innovativeness (OI) as a five-dimensional construct (creativity, openness, future orientation, risk-taking, and proactiveness) representing the organisational climate, which refers to the organization's ability to generate ideas and innovate continually over time. The findings support the conceptualization and operationalization of the five-dimensional OI, validated in Norway, Israel, and Spain. The results shed new light on existing findings

and promote new research directions as well as guide strategic managerial decision-making.

Casebourne (2014) proposed that creating the right cultures in organisations will help to overcome some of the barriers to public sector innovation, particularly those resulting from a lack of leadership, skills and capacity, and risk aversion due to a fear of failure. Appealing to public service norms, empowering employees, using incentives and performance appraisals, celebrating innovation through awards, and being careful with the use of extrinsic motivations are all sensible and evidenced approaches to harnessing individual motivation to innovate. Altruism (desire to serve the society) is indeed a strong driver for those working in the public sector. People contribute more to the provision of public good than is explained by pure self-interest (Crewson 1997) and that altruistic service motivations are alive and well in the public sector. However, this research also shows that public servants are not driven by altruism alone. Altruism combines with more self-interested motivations, and the way these combine affect behaviour in different ways (Le Grand 2006). Thresholds, levels and doses matter – people are altruistic only up to a point and they then require other rewards (like recognition, autonomy or a good work-life balance) to sustain altruism (Mulgan 2009).

Ginevičius & Vaitkūnaite (2006) investigated the relationship of organisational culture dimensions to organisational performance and reduced the number of the dimensions by content analysis and hierarchical structuring method. The authors also reviewed existing research literature of various constructs and tools used to measure the effects of organisational cultures to innovation and performance.

Factor 2: Leadership innovativeness refer to organisation leaders' attitudes and behaviours toward innovation that can transform organisation capability and performance. Leadership attitudes and practices have been emphasized as one of the most important factors that influence organisational innovation and innovativeness, because leaders can directly decide to introduce new ideas, set specific goals, and encourage innovation initiatives from subordinates (Aragon-Correa et al., 2007; Harbone & Johne, 2003; McDonough, 2000; and Sethi, 2000). In public sector, organisation leaders normally initiate strategic plans and mandates of the organisation.

Innovative leadership is linked to the concepts of transformational leadership (Gumusluoglu & Ilsev, 2009 and Chen et al., 2016) and commitment to innovation. Organisation leaders' attitudes and behaviours towards innovation can transform organisation capability and performance. Leadership can also be viewed as a collective group of activities and roles of leaders in the organisation according to modern strategic management view of integrated and networked approach (Hammer, 2016, Carson et al., 2007, and Ensley et al., 2003) rather than individualized leadership. In this study, F2: leadership innovativeness can be divided into 2 sub-factors of *IN05: transformation leadership* and *IN06: leadership commitment to innovation*.

IN05: Transformation leadership is a key predictor for organisational innovation (Chen et al, 2016; Mumford et al., 2002). Possible mediators between transformation leadership and innovation have been identified, including psychological empowerment, perceived support for innovation (Gumusluoglu & Ilsev, 2009; Jung et al., 2008; Sarros et al., 2008), organizational learning (García-Morales et al., 2012), and resources and policies (Oke et al., 2009). Organisation leaders convey clear sense of direction and opportunities to employees, open and responsive to changes, has realistic vision of the future for all departments and employees. Transformation treat staff as individuals, give encouragement, and support their developments (Fei & Rainey, 2003) and keep employees informed and involved in important decision making processes (Onag et al., 2014; Wilson-Evered, 2004).

IN06: Leadership commitment to innovation has been perceived as one of the cornerstones of innovation management, because leadership plays an important role in changing the status quo, in breaking away. Hence, it can be seen that there is a strong relationship between innovation and transformational leadership (Bass & Avolio, 1994). The characteristics of this type of leadership are that they create and communicate a clear vision that inspires and unites, thereby positively changing and creating new innovations and values to the organisation. In the public organisation, organisation leaders need to maintain and further operational integrity and performance of the organisation by genuine citizen engagement and promote co-created policies and services that aim at delivering public value and social outcomes (Hammer, 2016).

Factor 3: Strategy innovativeness refers to the ability of the organisation to manage ambitious organisational objectives, identify existing gaps, opportunities, and challenges, and leverage budget and resources effectively to achieve the desirable results. An organisation that has incorporated innovation as a part of its mission is more likely to be innovative (Suwannathat et al. (2015). Markides (1998) and Wang & Ahmed (2004) defines strategy innovativeness in private sector as a fundamental reconceptualization of what the business is all about, that in turn, leads to a dramatically different way of playing the game in an existing business. Martins & Terblanche (2003) identified strategy as one of determinants of creative and innovative organisation culture. Convey (1993) claims that the origin of creativity and innovation lies in a shared vision and mission, which are focus on the future. Innovative organisation has vision and mission that are customer- and market-oriented, focusing on solving customers' problems (CIMA Study Text, 1996). Top leaders and management must prescribe to a set of strategic goals towards innovation and recognise and capture opportunities as they arise to improve organisation capabilities and performance. Indicators of strategic innovativeness include explicit strategy for competitiveness, shared visions, goals and directions, clear plan and action towards targets, and policy coherence.

In this study, F3: strategy innovativeness can be divided into 2 sub-factors of IN(07) Strategic initiations towards innovation and IN(08) Strategic follow-through to mitigate changes and increase resilience and performance.

IN(07) Strategic initiations towards innovation refer to the ability of the organisation to recognise new opportunities and societal challenges and successfully integrated them into the organisation strategic plans and project operations (Suwannathat et al., 2015). Political forces, new laws, new government policies or priorities are identified as driving forces for innovation activities (CFA and DAMVAD, 2009). Innovation development and promotion are part of strategic missions and mandates of the organisation (CFA and DAMVAD, 2009; NESTA, 2011). The strategic goals, mandates, and policies of this organisation are shared and articulately conveyed to all employees (Chen, et al., 2016; Liao et al., 2008; Hammer, 2016). Top executives

of the organisation develop clear view of ambitious and achievable final aims more than less significant short-term objectives.

IN(08) Strategic follow-through to mitigate changes, increase resilience, and performance refers to the ability of the organisation to effectively incorporate changes in new mandates, policies, and initiatives from the government into their strategic plans and operations. This can be achieved by clearly defined employee work goals in all the departments/units against measureable criteria and operation mechanisms that are aligned to the organisation's objectives and KPIs (Hammer, 2016; Martins & Terblanche, 2003). The innovation objectives needs to be aligned and matched to performance priorities (NESTA, 2011).

Factor 4: Workforce innovativeness refers to staff's competency, capability, and devotion to innovation. Having diversified qualifications, experienced, capable and talented workforce has been shown to be positively linked to innovation development (Caird et al., 2013). Innovative organisation needs innovative, talented, motivated and capable workforce. It should be noted that characteristics of innovative workforce such as creativity, openness, risk taking and tolerance, and new public management values are already captured in this construct under the F1: culture innovativeness. In this study, F4: workforce innovativeness is reflected in two sub-factors of *IN(09) Motivated workforce* and *IN(10) Capable workforce*.

IN(09) Motivated workforce refers to the motivation of the staff in the organisation to take positive action to further the organisation's interests and achieve organisational objectives (Hammer, 2016) and willingness and commitment to put in a great deal of effort beyond that normally required in order to help the organisation be successful (Malik and Wilson, 1995). Employees are more likely to be motivated to put in efforts to perform well if they believe that their hard work and achievements are fairly recognised and rewarded (Suwannathat et al., 2015; CFA and DAMVAD, 2009). In public organisation, altruism (desire to serve the society) is considered a strong driver for employees to perform well in their work in order to service the public and improve the society (Casebourne, 2014). However, research by Crewson (1997) also shows that public servants are not driven by altruism alone. Altruism combines with more self-interested motivations, and the way these combine affect behaviour in different ways

(Le Grand 2006). Thresholds, levels and doses matter; people are altruistic only up to a point and they then require other rewards (like recognition, autonomy or a good work–life balance) to sustain altruism (Mulgan 2009).

IN(10) Capable workforce refers to the capability of the staff in the organisation to be innovative and perform well in their work. Innovative and well-performed organisation required talented workforce in terms of their educational backgrounds and experiences, which after the recruitment process can also be improved via training opportunities, workshops, and further educations that suit to employees' interests and improve their skills and knowledge. Innovative organisation supports life-long learning and invest in activities that support the development of individuals and teams directed towards current and future roles. Workforce capability positive effects on organisational innovativeness have been supported via various studies and constructs (Caird et al., 2013; Hammer, 2016; EU Community Innovation Survey, 2014; Liao et al., 2008; Fei and Rainey, 2003).

Factor 5: Resources and infrastructure innovativeness refers to the ability of the organisation to allocate, leverage, and maximize its resources and intellectual capital such as budgets and funds, ICT investments, R&D, and accumulated knowledge to create innovation, new knowledge, and improve efficiencies and performance of the organisation. In this study, F5: Infrastructure and resource innovativeness can be divided into 3 sub-factors, which are *IN(11) Budget & fund for innovation*, *IN(12) R&D for innovation*, and *IN(13) ICT & e-government*.

IN(11) Budget & fund for innovation. Innovative organisation allocates sufficient amount of budget & fund specifically to develop new initiatives and better programmes, products, processes or services (Caird et al., 2013; NESTA, 2011) as well as to improve internal work processes, practices, and operations of the organisation (CFA and DAMVAD, 2009).

IN(12) R&D for innovation. Innovative organisation invests in internal in-house R&D unit steered by a dedicated and capable group of personnel and may also hire or collaborate with external experts to introduce new programmes, projects,

products or services (Caird et al., 2013; CFA and DAMVAD, 2009; EU Community Innovation Survey, 2014).

IN(13) ICT & e-government. Innovative public/government organisation has up to date ICT infrastructure in promoting its outputs and services to the public and for internal communication and operational purposes. Examples of good ICT and e-government organisation include all employees are equipped with personal computers, have access to broadband internet, and Wi-Fi and the organisation website is informative, regularly maintained, and updated with current organisational information, management structure, activities, news, latest products and services, publications, and staff contact details.

Factor 6: Management innovativeness refers to the capability and practice of the organisation management teams in using new public management approaches, knowledge management, organisational learning, and absorptive capacity to improve innovation processes, exploit the human capital and resources, challenge existing structure and framework conditions within the organisations in order to be more productive and improve services. Management innovativeness also includes how the organisation manages new ideas, implement practices and diffuse what works within the organisations to facilitate the process of organisation administration and management (EPSIS, 2013 and DIISR, 2011c). In this study, F6: management innovativeness can be divided in to 2 sub-factors of *IN(14) Management practice* and *IN(15) Management capability*.

IN(14) Management practice refers to the way of doing things of management teams in converting the inputs and resources into desirable outputs, outcomes, and impacts to improve the organisation and to serve the public. Characteristics of innovative management practices are decentralization operation, openness, cross-functional teamwork and communications, and organisation structure that promotes better coordination, knowledge management and learning organisation. Management team need to encourage employee involvement in initiating, selecting, developing, implementing and diffusing ideas, practices and what works. In order for the organisation to be innovative and competitive, management has to be able to provide their staff with instruments (manuals, databases, files, organisational routines)

that allow what has been learnt in the past situations or projects to remain valid and help the work processes to operate smoothly and effectively, although the employees are no longer the same (Onag et al., 2014; Wilson-Evered, 2004); promote cross-functional teamwork among different departments/units within the organisation in order to share expertise and achieve the best results and outputs (Onag et al., 2014; Caird et al., 2013; Fei and Rainey, 2003); place employees in positions or ranks suitable to their responsibilities, capabilities and skills; and the structure of the management is of suitable size and chains of commands that can effectively carry out the organisational functions and mandates as well as quickly responsive to changes in plans, strategies, and policies.

IN(15) Management capability refers to the ability of the management teams in converting the inputs and resources into desirable outputs, outcomes, and impacts to improve the organisation and to serve the public. In order for the organisation to be innovative and competitive, management has to be capable of developing, promoting and retaining talented or high performing employees (Hammer, 2016); provide useful insights, feedbacks and comments that help to identify potential opportunities and eliminate problems (Onag et al., 2014); and ensure that new work processes and developments that may be helpful to the organisation as a whole are usually discussed and shared with all employees (Onag et al., 2014).

Factor 7: Performance innovativeness can be measured based on how the outputs and outcomes of the projects and services of the public organisation are handled and monitored in order to ensure that the organisation meets its targets and goals. Innovative organisations have reliable performance management system in place, seek to incorporate performance measurement effectively into its day-to-day operations, and refine existing performance measurement system when necessary to reflect changing national policies, strategic agendas and solving social problems (Wolk et al., 2009). The performance indicators include tangible and intangible outputs achieved, performance monitoring and evaluation, performance assessment in comparison with other peer organisations. In this study, F7: performance innovativeness can be reflected in 3 sub-factors of IN(16) Innovative results, outputs, and outcomes, IN(17) New methods/ processes that improve organisation's productivity, capability, and

performance, and IN(18) Efficient, effective, and impartial evaluation mechanism and performance reward system.

IN(16) Innovative results, outputs, and outcomes. Innovative public organisation consistently produces innovative outputs such as new and better products and improved services, new patents, new designs and copyrights, new programmes, and policies to serve the public (Aragon-Correa et al., 2007; Caird et al., 2013; Wang & Ahmed, 2004; EU Community Innovation Survey, 2014) and achieved its annual set targets, and KPIs (Wolk et al., 2009). In comparison to the organisation's peer institutions with similar mandates and functions both nationally and internationally, innovative and competitive public organisation has to outperform them. Innovative results, outputs and outcomes also include research articles in well-respected international journals as well as other high quality publications e.g. official reports, white papers, and newsletters etc. to enhance society awareness and public knowledge (Caird et al., 2013; EU Innovation Scorecard, 2016).

IN(17) New methods/ processes that improve organisation's productivity, capability, and performance. Innovative organisation consistently makes a commitment to routinely track, announce, and communicate its results and performances to external stakeholders via e.g. annual reports, stakeholders meetings, online discussion forums, network meetings, conferences and seminars etc. (Wolk et al., 2009; Nordic MEPIN pilot survey, 2009); successfully updates existing internal work processes and operational methods that result in improvement of organisational efficiency, productivities, and performance (Caird et al., 2013; EU Community Innovation Survey, 2014); and consistently and routinely conducts users' satisfactory surveys measuring the organisational performances and successfully utilised the results to improve existing operations and practices (Wolk et al., 2009; CFA and DAMVAD, 2009).

IN(18) Efficient, effective, and impartial evaluation mechanism and performance reward system. Innovative organisation has effective and efficient performance measurement system in place (e.g. balanced scorecard, management dashboard, report card, and KPI tracking time series charts etc.) that are utilised and follow-through by all employees to monitor and evaluate how mission and vision of

success are linked and translated to organisational department/division activities and operations (Wolk et al., 2009); utilises effective, independent, and impartial internal audit department that constantly monitors, evaluates, and provides feedbacks and recommendations to improve operations and performance of all departments/units within the organisation (Wolk et al., 2009); and complies to independent and impartial external audit and/or panel of experts that evaluates its targets, KPIs and performance (Wolk et al., 2009).



Factor 8: Network and external contexts innovativeness refers to utilisation of collaborative networks and alliances; and favourable policy, political and legislative conditions for innovation to improve services and performance. Collaborative network nationally and international with other public agencies, private sector and academia can enhance innovative capability and help shared resources to achieve shared targets. External contexts can interfere with how the organisation handles its innovation processes and implementations and can be both drivers and barriers to organisational innovativeness depending on how the circumstances are managed (DIISR, 2011c). In this study, F8: Network and External Context Innovativeness can be divided into 2 sub-factors, which are *IN(19) Collaborative networks and cooperation with other agencies* and *IN(20) Favourable external contexts for innovation*.

IN(19) Collaborative networks and cooperation with other agencies. Innovative organisation establishes and maintains good national and international collaborative networks and research cooperation with other innovative organisations (Caird et al., 2013; CFA and DAMVAD, 2009; EU Community Innovation Survey, 2014; NESTA, 2011) and engages in and benefits from cross-sectoral collaborative partnerships with other public agencies, private business enterprises, universities and non-profit organisations (Caird et al., 2013; CFA and DAMVAD, 2009).

IN(20) Favourable external contexts for innovation. Innovative organisation ensures that it can fully benefit from national and/or local government policies and regulations that promote innovations and innovation related activities (R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units) (CFA and DAMVAD, 2009; NESTA, 2011); consistently able to receive external financial supports, from the national and/or local governments and/or private businesses or foundations to invest in innovations and innovation related activities (CFA and DAMVAD, 2009; EU Community Innovation Survey, 2014); and government policies, laws and regulations, and political mandates and climates help foster innovation and innovation related activities in the organisation (CFA and DAMVAD, 2009).

The reference list numbers in Table 2.6 are as follows:

- [1] Ruvio, A. A., Shoham, A., Vigoda-Gadot, E. & Schwabsky, N. (2013).
- [2] Wang, C. L. & Ahmed, P. K. (2004).
- [3] Chen, L., Zheng, W., Yang, B., & Bai, S. (2016).
- [4] Hammer, B. (2016).
- [5] Bekkers, V., Edelenbos, J., & Steijn, B. (2011).
- [6] Onag, A. O., Tepeci, M., & Basalp, A. A. (2014).
- [7] Aragon-Correa, J. A., Gacia-Morales, V. J., & Cordon-Pozo, E. (2007).
- [8] Malik, S. D. & Wilson, D. O. (1995).
- [9] Walsh, M., Lynch, P., & Harrington, D. (2009).
- [10] Liao, S-h., Fei, W-C., & Liu, C-T. (2008).
- [11] Ginevičius, R. & Vaitkūnaite, V. (2006).
- [12] Suwannathat, P., Decharin, P., & Vatanawood, W. (2012).
- [13] Caird, S. Hallett, S., & Potter, S. (2013).
- [14] Wilson-Evered, E., Hartel, C., & Neale, M. (2004).
- [15] Martins, E. C. & Terblanche, F. (2003).
- [16] Casebourne, J. (2014).
- [17] Parzefall, M-R., Seeck, H., & Leppanen, A. (2008).
- [18] Gunsel, A., Siachoub, E., & Acar, A. Z. (2011).
- [19] Fei, T. L. K. & Rainey, H. G. (2003).
- [20] Wolk A., Dholakia A., & Kreitz K., (2009).
- [21] The Korea Government Innovation Index (GII). (2005). Yoon, J. I. (2006). Kim, S. E., Lee, J. W., & Kim, B. S. (2007).
- [22] The Nordic MEPIN (2011). Bloch, C. (2010). Bugge, M. M., Hauknes, K., Bloch, C., & Slipersater, S. (2011).
- [23] The UK PSII (2011). NESTA (March 2011). Hughes, A., Moore, K. & Kataria, N. NESTA, 2011; CFA & DAMVAD, 2009; Deloitte, 2009; Ernst & Young, 2009; and The Innovation Unit, 2009).
- [24] The Australia PSII (2012). (DIISR, April 2011a; June 2011b; and June 2011c).
- [25] The European Public Sector Innovation Scoreboard (2012). EPSIS, 2013 and Technopolis Group, (2011- 2013).

The proposed item statements or indicators for measuring public organisational innovativeness (POINT) along with the corresponding references where the items statements were adapted from are shown in Table 2.7 below.

**Table 2.7: Proposed item statements or indicators
for measuring POINT and their references**

| Item statements | Reference and rationale |
|--|--|
| <p>(IT01) In this organisation, staff are always encouraged to come up with new ideas and original approaches when dealing with problems in the workplace.</p> | <p>Adapted from Ruvio et al. (2013): Managers are encouraged to use original approaches when dealing with problems in the workplace.</p> <p>Malik & Wilson (1995): Creativity is encouraged here. People in this organisation are always searching for fresh, new ways of looking at problems.</p> <p>Nordic MEPIN pilot survey (2009): Managers give high priority to developing new ideas or new ways of working.</p> <p>UK Public Sector Innovation (NESTA, 2011): Space and capacity for creative thinking.</p> <p>Fei & Rainey (2003), innovation factor: Creativity is actively encouraged in this organisation. We are encouraged to make suggestions for improvements in our work. People in my work unit are encouraged to try new and better ways of doing the jobs.</p> |
| <p>(IT02) This organisation constantly innovates in order to deliver new and better outputs and improved services to the public.</p> | <p>Adapted from Ruvio et al. (2013): We are constantly looking to develop and offer new or improved services.</p> |

| Item statements | Reference and rationale |
|--|---|
| | <p>Malik & Wilson (1995): This organisation is always moving towards the development of new answers.</p> <p>Martins & Terblanche (2003), from Lock and Kirkpatrick (1995): Our company will innovate endlessly to create new and valuable products and services and to improve our methods of producing them.</p> <p>Nordic MEPIN pilot survey (2009): Top management is active in leading the implementation of innovations.</p> |
| (IT03) This organisation tolerates individuals who do things in a different way. | <p>Taken from Wang & Ahmed (2004): In our company, we tolerate individuals who do things in a different way (Behavioral Innovativeness).</p> |
| (IT04) In this organisation, staff can challenge the status quo of how things are done without being penalised. | <p>Adapted from: Hammer (2016): Leaders that support employees to take risks, encourage them to challenge the status quo, and learn from mistakes.</p> <p>Adapted from Onag et al. (2014) Factor 5 Experimentation and Openness: Part of this firm's culture is that employees can express their opinions and make suggestions regarding the procedures and methods in place for carrying out tasks. Factor 3: Participative decision making; From my experience, people who are new in this organisation are encouraged to question the way things are done.</p> <p>Malik and Wilson (1995): My supervisor encourages people to speak up when they disagree with a decision.</p> |

| Item statements | Reference and rationale |
|--|---|
| | <p>Fei and Rainey (2003), Trust factor: Within reason, people in this organisation can say what they want without fear of punishment.</p> |
| <p>(IT05) In this organisation, staff are encouraged to communicate at all levels across different departments in order to share ideas, discuss best practices, report errors and failures as a way to improve the organisation.</p> | <p>Adapted from Onag et al. (2014) Factor2: Employees are encouraged to communicate. Factor 5: Experimentation and Openness; I can often bring new ideas and share them in the organisation. This firm promotes experimentation and innovation as a way of improving the work processes. Part of this firm's culture is that employees can express their opinions and make suggestions regarding the procedures and methods in place for carrying out tasks. Factor 1: Knowledge sharing; Errors and failures are always discussed and analysed in this firm on all levels. I often have an opportunity to talk to other staff about successful programs or work activities in order to understand why they succeed. Employees have the chance to talk among themselves about new ideas, programmes, and activities that might be useful to the firm.</p> |
| <p>(IT06) In this organisation, staff are encouraged to explore and tryout in order to find new ways of doing things and learn from their mistakes, knowing well that some will fail.</p> | <p>Adapted from Ruvio et al. (2013) and Jaworski & Kohli (1993): This organisation... Encourages innovative strategies, knowing well that some will fail. Adapted from Wang & Ahmed (2004) Behaviour innovativeness:</p> |

| Item statements | Reference and rationale |
|---|--|
| | <p>We get a lot of support from managers if we want to try new ways of doing things.</p> <p>Malik & Wilson (1995): This organisation seems to place a high value on taking risks, even if there are occasional mistakes.</p> <p>UK Public Sector Innovation (NESTA, 2011): Attitude to risk taking and management.</p> |
| <p>(IT07) This organisation provides supportive mechanisms, incentives, and rewards for all staff to take risks in order to perform better in their jobs.</p> | <p>Adapted from Onag et al. (2014) Risk taking; Employees will take risky decisions to perform better in their jobs. People are encouraged to take risks to learn from their failures and mistakes.</p> |
| <p>(IT08) This organisation is constantly streamline internal operations and work processes to be more efficient and become less bureaucratic.</p> | <p>Adapted from Bekkers et al. (2011) links NPM to innovation in public sector. The item statement is derived from the concept of NPM.</p> |
| <p>(IT09) This organisation can be described as flexible and continually adapting to changes and challenges.</p> | <p>Taken Malik & Wilson (1995): This organisation... Can be described as flexible and continually adapting to change.</p> <p>Liao et al. (2008): Organisation does not stick to its old ways of thinking but embrace innovative ideas. (Reverse item): My company has rigid operational procedures and lacks flexibility and innovation.</p> <p>Martins & Terblanche (2003), a flat structure, autonomy and work teams will promote innovation, whereas centralization will inhibit innovation. Cultural values and organisational structure that have</p> |

| Item statements | Reference and rationale |
|--|--|
| | flexibility, freedom, and cooperative teamwork will promote creativity and innovation. On the other hand, rigidity, control, predictability in hierarchical structure will hinder creativity and innovation (Arad et al., 1997). |
| (IT10) Top leaders and executives of this organisation always treat staff as individuals, give advices and encouragements, and support their developments. | Adpated from Fei & Rainey (2003), Leadership Style: Treat staff as individuals, supports and encourage their developments. Gives encouragement and recognition to staff. The authors used the Global Transformational Leadership scale developed by Carless, Weaving, and Mann (2000). |
| (IT11) Top leaders and executives of this organisation often provide their ministers and government with frank and experts advices based on research and evidences. | Adapted from Hammer (2016) statement under Table 1: Stewardship and citizen-centricity; Leaders that effectively manage the relationship with their minister, and provide the minister with frank and expert advice. Rationale: Innovative public organisation can influence the direction and policy of their ministers and government. |
| (IT12) Top leaders and executives of this organisation often keep employees informed and involved in important decision making processes. | Adapted from Onag et al. (2014): Adapted from Factor 3: Participative decision making; People feel involved in main company decisions. Factor 1: Knowledge sharing; The managers frequently involve their staff in important decision making processes. Malik & Wilson (1995): My supervisors encourages subordinates to participate in important decisions. |

| Item statements | Reference and rationale |
|--|---|
| <p>(IT13) Top leaders and executives of this organisation act as catalysts of constructive changes and seek to remove barriers for the organisation to succeed.</p> | <p>Adapted from Hammer (2016) statement of change and innovation; Leaders who are catalysts of constructive change and who seek to influence, overcome resistance and remove barriers.</p> <p>UK Public Sector Innovation (NESTA, 2011), leadership and culture factor: vision and spirit of senior management towards innovation.</p> |
| <p>(IT14) Top leaders and executives of this organisation provide opportunities, tools, and supporting environment for the employees to be innovative and able to succeed in their jobs.</p> | <p>Adapted from Hammer (2016) statement under supportive environment: Leaders who take a genuine interest in employees build trust, manage conflict, adapt interpersonal styles and provide the appropriate tools and environment to provide employees the best opportunity to succeed.</p> |
| <p>(IT15) Top leaders and executives of this organisation are genuinely committed to operate the organisation with integrity to serve the public and create positive social impact.</p> | <p>Adapted from Hammer (2016): Leaders that maintain and further operational integrity and performance of the organisation. Genuine citizen engagement and evidence of co-created policies and services aimed at delivering public value and social outcomes.</p> |
| <p>(IT16) New opportunities and societal challenges are often recognised and successfully integrated into the organisation strategic plans and project operations.</p> | <p>Adapted from Suwannathat et al. (2015): Strategic orientation: The essence of a leader's commitment is to develop visions for an organisation to effectively recognise strategic opportunities as they arise and successfully seek new capabilities or policies necessary to capture opportunities.</p> <p>Political forces, new laws, new government policies or priorities are identified as driving forces for innovation</p> |

| Item statements | Reference and rationale |
|--|---|
| | activities (Nordic MEPIN pilot survey, 2009). |
| (IT17) Innovation development and promotion are part of strategic missions and mandates of this organisation. | <p>Nordic MEPIN pilot survey (2009): The organisation has specific goals/targets for innovation activities. An innovation strategy is included in the overall vision or strategy of the organisation.</p> <p>The pilot study's findings of UK Public Sector Innovation (NESTA, 2011) suggest that those organisations with innovation strategies are more innovative (across all indicators) than those organisations without.</p> |
| (IT18) The strategic goals, objectives, mandates, and policies of this organisation are shared and understood by all the staff and any changes are always articulately conveyed to all employees. | <p>Adapted from the proposed items in the construct of TFL by Chen, et al. (2016). TFL was measured using the 16-item scale from Bass and Avolio's (1997). Multifactor Leadership Questionnaire.</p> <p>Liao et al. (2008): Organisational chiefs share future vision with its member.</p> <p>Hammer (2016), Vision and communication: Frequent and transparent communication from leaders that keeps employees informed about events and engaged with organisational objectives.</p> |
| (IT19) Top executives of this organisation develop clear view of ambitious and achievable final aims more than less significant short-term objectives. | <p>Taken from Aragon-Correa et al. (2007) Transformation leadership item statement: Top executives try to develop a clear common view of final aims more than short-term objectives.</p> <p>Hammer (2016) Vision and communication: Leaders have a clear, compelling and aspirational vision that articulates that success looks like for the organisation.</p> |

| Item statements | Reference and rationale |
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| | <p>Fei and Rainey (2003), Leadership Style: Communicates a clear and positive vision of the future.</p> |
| <p>(IT20) In this organisation, employee work goals are clearly defined against measurable criteria and are aligned to the organisation's objectives and KPIs.</p> | <p>Taken from Hammer (2016): Employee work goals are clearly defined against measurable criteria and are aligned to the organisation's objectives.</p> <p>Martins and Terblanche (2003) the dimensions of ideal organisational culture (Martins, 1987, 1997): Personnel's understanding of the vision, mission, and values of the organisation and how these can be transformed into measurable individual and team goals and objectives.</p> <p>UK Public Sector Innovation (NESTA, 2011): Innovation objectives alignment to performance priorities.</p> |
| <p>(IT21) In this organisation, there are effective strategic follow-through mechanisms and operations to support unexpected changes of top government policies, priorities, or mandates.</p> | <p>Adapted Fei and Rainey (2003), Management support factor for TQM implementation: Managers here always try to plan ahead for changes that might affect our performance.</p> <p>Suwannathat et al. (2015): Strategic orientation: The essence of a leader's commitment is to develop visions for an organisation to effectively recognise strategic opportunities as they arise and successfully seek new capabilities or policies necessary to capture opportunities.</p> <p>Nordic MEPIN pilot survey (2009): Political forces, new laws, new government policies or priorities are</p> |

| Item statements | Reference and rationale |
|--|--|
| | identified as driving forces for innovation activities |
| <p>(IT22)</p> <p>In this organisation, employees are willing to put in a great deal of effort beyond that normally required in order to help this organisation to be successful and competitive.</p> | <p>Taken from Malik & Wilson (1995): Employee commitment factor: I am willing to put in a great deal of effort beyond that normally required in order to help this organisation be successful.</p> <p>Hammer (2016): Employees take positive action to further the organisation's interests and achieve organisational objectives.</p> |
| <p>(IT23)</p> <p>In this organisation, employees believe that their hard work and achievements are justly recognised, appreciated, and well rewarded.</p> | <p>Adapted from Suwannathat et al. (2015): Employees are more likely to be creative when they are empowered to take initiative for solving problems (Leonard-Barton, 1995). It is important to reward individuals as well as teams, particularly on specific projects relevant to innovation (Tushman et al., 1997).</p> <p>Nordic MEPIN pilot survey (2009): Staff have incentives to identify new ideas and take part in their development.</p> <p>Rationale from in-depth interviews: Employees who believe that their hard work and achievements are fairly recognised and rewarded are more likely to be motivated and be innovative to perform better in their jobs.</p> |
| <p>(IT24)</p> <p>In this organisation, employees are constantly motivated and self-driven to deliver better services, improved outputs, and values to the public.</p> | <p>Adapted from Casebourne (2014): Altruism (desire to serve the society) is indeed a strong driver for those working in the public sector. We also know that people contribute more to the provision of public good than is explained by pure self-interest (Crewson 1997) and that altruistic</p> |

| Item statements | Reference and rationale |
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| | <p>service motivations are alive and well in the public sector.</p> <p>However, this research also shows that public servants are not driven by altruism alone. Altruism combines with more self-interested motivations, and the way these combine affect behaviour in different ways (Le Grand 2006). Thresholds, levels and doses matter – people are altruistic only up to a point and they then require other rewards (like recognition, autonomy or a good work–life balance) to sustain altruism (Mulgan 2009).</p> |
| <p>(IT25) Most of this organisation workforce is educated to post-graduated levels of master or doctoral degrees.</p> | <p>Adapted from Caird et al. (2013): Innovation success indicators: Human Resources Enablers, Are you, your colleagues or employees educated to post-graduate or doctoral level? Participating in tertiary or further education?</p> <p>MEPIN survey (2009): The staff is diverse in terms of background (demographic, educational).</p> <p>Rationale: Highly educated, skilled, and talented workforce is more likely to innovate.</p> |
| <p>(IT26) In this organisation, employees are highly skilled with relevant expertise suitable to their job descriptions and duties.</p> | <p>In-depth interviews and recommended by advisor.</p> |
| <p>(IT27) In this organisation, employees often have opportunities to participate in trainings, workshops, and further education that suit their interests</p> | <p>Adapted from Caird et al. (2013): Are you, your colleagues or employees - Supporting life-long learning? Participating in education and training linked to innovative projects?</p> |

| Item statements | Reference and rationale |
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| to improve their skills and knowledge. | <p>Hammer (2016): Learning and development: Meaningful investment in activities that support the development of individuals and teams directed towards current and future roles.</p> <p>EU Community Innovation Survey (2014): During the three years 2012 to 2014, did your enterprise engage in the following innovation activities: In-house or contracted out training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes.</p> <p>Liao et al. (2008): (R) My unit/enterprise does not offer me any opportunity to learn new concepts and methods.</p> <p>Fei & Rainey (2003), Team effectiveness factor: There is almost always some kind of employee training going on in our organisation.</p> |
| (IT28) In this organisation, employees are generally recognised as very talented and highly capable in their jobs by other organisations. | <p>Adapted from Fei & Rainey (2003); My job requires me to use a number of complex or high-level skills.</p> <p>Also obtained from qualitative interviews with experts and top managers of ASEAN public organisations.</p> |
| (IT29) This organisation has sufficient budgets or funds allocated specifically to continually develop new initiatives and better programmes, products, | <p>Adapted from Caird et al. (2013): Does your organisation provide business R&D expenditure, for research and development, major modifications, incremental changes, new designs, mock-</p> |

| Item statements | Reference and rationale |
|--|---|
| processes, and services to the public. | <p>ups, mash-ups, new combinations of existing products, and technology adoption?</p> <p>Does your organisation provide non R&D innovation expenditures?</p> <p>UK Public Sector Innovation (NESTA, 2011): Access to innovation funds and supports.</p> |
| (IT30) This organisation has sufficient budgets or funds allocated specifically to continually improve internal work processes, practices, and operations of the organisation. | <p>Adapted from Nordic MEPIN pilot survey (2009):</p> <p>Does your organisation provide non R&D innovation expenditures?</p> |
| (IT31) This organisation invests in in-house R&D unit steered by a dedicated and capable group of personnel and experts that continues to introduce new products and improved services to the public. | <p>Adapted from Caird et al. (2013):</p> <p>Does your organisation provide business R&D expenditure, for research and development, major modifications, incremental changes, new designs, mock-ups, mash-ups, new combinations of existing products, and technology adoption?</p> <p>Nordic MEPIN pilot survey (2009):</p> <p>The organisation has a development department/section.</p> <p>Innovation activities are mainly organised as projects, steered by a dedicated group.</p> |
| (IT32) This organisation hires and/or collaborates with external experts in conducting R&D activities to develop new and better outputs of products and services to the public. | <p>Adapted from Nordic MEPIN pilot survey (2009):</p> <p>The organisation hire external R&D, know-how, or other consultancy services for innovation.</p> <p>EU Community Innovation Survey (2014):</p> <p>Your enterprise contracted-out R&D to other enterprises (include</p> |

| Item statements | Reference and rationale |
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| | enterprises in your own group) or to public or private research organisations. |
| (IT33) This organisation is able to provide and maintain reliable and secure computer network, fast internet broadband access, and high quality Wi-Fi connections for all employees at all times. | Adapted from Caird et al. (2013): Is your organisation benefiting from broadband access? Does your organisation provide ICT expenditure? UK Public Sector Innovation (NESTA, 2011): Innovation enabler: access to adequate IT systems and ICT infrastructure. |
| (IT34) This organisation has efficient and reliable ICT division that is always capable of helping its employees with computer usage and other ICT related problems. | Adapted from Caird et al. (2013): Is your organisation benefiting from broadband access? Does your organisation provide ICT expenditure? [23] UK Public Sector Innovation (NESTA, 2011): Innovation enabler: access to adequate IT systems and ICT infrastructure. |
| (IT35) This organisation established its official website in local and English languages and regularly updates it with current organisation projects, latest activities, news, latest products and services, publications, management structure, and staff contact details. | Obtained from qualitative in-depth interviews with experts and top managers of ASEAN public organisations. |
| (IT36) This organisation makes full use of available information and communication technologies, social media platforms and | Obtained from qualitative in-depth interviews with experts and top managers of ASEAN public organisations. |

| Item statements | Reference and rationale |
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| mobile phone applications to improve daily operation, widen public engagement, and improve services. | Public organisations find it is very effective to make use of new available platforms of social media and mobile phone applications to engage in public interests and utilise them as new communication channels among staff. |
| (IT37) This organisation has instruments (manuals, databases, files, organisational routines) that allow what has been learnt in the past situations or projects to remain valid and help the work processes to operate smoothly and effectively, although the employees are no longer the same. | Adapted from Onag et al. (2014), factor 6: knowledge transfer factor: This firm has instruments (manuals, databases, files, organisational routines) that allow what has been learnt in past situations to remain valid, although the employees are no longer the same. Malik & Wilson (1995): Standard operating procedures or practices specify how my major tasks are to be done. There are written procedures for dealing with various situations that may arise in performing my work. |
| (IT38) Management of this organisation promotes cross-functional teamwork among different departments/units within the organisation in order to share expertise and achieve the best results and outcomes. | Onag et al. (2014): Cross-functional teamwork is a common practice here. (R) Teamwork is not the usual way to work. Caird et al. (2013): Does your organisation support multi-departmental, multi-functional, and multi-disciplinary collaborations? Fei & Rainey (2003): Management here does a good job of communicating with employees. |
| (IT39) In this organisation, employees are well placed in positions and divisions suitable to their | Obtained from qualitative in-depth interviews with experts and top managers of ASEAN public organisations. |

| Item statements | Reference and rationale |
|--|---|
| responsibilities, capabilities, and skills. | |
| (IT40) The management structure of this organisation is of suitable size, hierarchy, and chains of commands that can effectively carry out the organisational functions and mandates as well as quickly response to changes in plans, strategies, and operations. | Obtained from qualitative in-depth interviews with experts and top managers of ASEAN public organisations. |
| (IT41) In this organisation, management and human resource department are capable of developing, promoting and retaining talented or high performing employees. | Adapted from Hammer (2016): Workforce planning and talent management: demonstrate processes that identify, develop, and retain high performing employees. |
| (IT42) In this organisation, management can often provide useful insights, feedbacks and comments that help to identify potential opportunities and eliminate problems. | Adapted from Onag et al. (2014): Managers in this organisation often provide useful feedback that helps to identify potential problems and opportunities. |
| (IT43) In this organisation, management ensures that new work processes and developments that may be helpful to the organisation as a whole are usually discussed and shared with all employees. | Adapted from Onag et al. (2014): New work processes that may be useful to the organisation as a whole are usually shared with all employees. |
| (IT44) In this last three years, this organisation has consistently produced innovative outputs such as new and improved products and services, new | Aragon-Correa et al. (2007) used eight-item scale to measure organisational performance based on the last 3 years. Caird et al. (2013) Open2-Innova8ion Tool: Innovation outputs – Have your |

| Item statements | Reference and rationale |
|--|---|
| <p>patents, new designs and copyrights, new programmes, new initiatives, projects, and policies.</p> | <p>organisation been involved with the introduction of product, process system or marketing, organisational innovations? What are your innovation outputs? E.g. introductions of product, process, service; Resource efficiencies e.g. reducing labour, materials, energy costs. Employment opportunities (especially technological, manufacturing and knowledge intensive services).</p> <p>Wang & Ahmed (2004): In comparison with our competitors, our company has introduced more innovative products and services during the past five years.</p> <p>EU Community Innovation Survey (2014): During the three years 2012 to 2014, did your enterprise introduce: Goods innovations: New or significantly improved goods (exclude the simple resale of new goods and changes of a solely aesthetic nature). Service innovations: New or significantly improved services.</p> |
| <p>(IT45) In this last three years, this organisation has consistently produced high number of research articles in well-respected national and international journals as well as other high quality publications such as official reports, white papers, and newsletters etc. that help enhance public knowledge.</p> | <p>Adapted from Caird et al. (2013) Open2-Innova8ion Tool: Does your organisation support public-private research co-publications.</p> <p>EU Innovation Scorecard (2016): International scientific co-publications are a proxy for the quality of scientific research as collaboration increases scientific productivity.</p> |
| <p>(IT46) In the last three years, this organisation has consistently</p> | <p>Adapted from Wolk et al. (2009):</p> |

| Item statements | Reference and rationale |
|---|---|
| achieved its annual set targets, objectives, and KPIs. | Obtained from qualitative in-depth interviews with experts and top managers of ASEAN public organisations. |
| (IT47) In this last three years, in comparison with other peer organisations with similar functions and mandates <i>in the same country</i> , this organisation consistently outperforms them. | Adapted from Aragon-Correa et al. (2007) used eight-item scale to measure organisational performance based on the last 3 years. The CEO were asked to compare these measures with their principal competitors' performance. The use of scales evaluating performance in comparison with main competitor is one of the practices most widely used in recent studies to provide an objective reference for sampled managers (Steensman & Corley, 2000). Wang & Ahmed (2004): IN06 In comparison with our competitors, our company is fastest in bringing new products or services into the market. In comparison with our competitors, our company has a lower success rate in new products and services launch (R). In comparison with our competitors, our products' most recent marketing programme is revolutionary in the market. |
| (IT48) In this last three years, in comparison with other peer organisations with similar functions and mandates <i>internationally or globally</i> , this organisation consistently outperforms them. | Aragon-Correa et al. (2007) used eight-item scale to measure organisational performance based on the last 3 years. The CEO were asked to compare these measures with their principal competitors' performance. The use of scales evaluating performance in comparison with main competitor is one of the practices most widely used in recent studies to provide an objective reference for sampled managers (Steensman & Corley, 2000). |
| (IT49) In this last three years, this organisation consistently | Adapted from Wolk et al. (2009): |

| Item statements | Reference and rationale |
|---|---|
| <p>commit to routinely track, announce, and communicate its results and performances to external stakeholders via e.g. annual reports, stakeholders meetings, online discussion forums, network meetings, conferences and seminars etc.</p> | <p>Your org. makes a commitment to routinely track and communicate its results to external stakeholders via e.g. annual external report, stakeholders meetings etc.</p> <p>Nordic MEPIN pilot survey (2009): How important were the following information channels for your innovation activities? Internet and online discussion forum User satisfactory surveys Networks, conferences, seminars, other gatherings Evaluations (e.g. of quality, impact, and efficiency).</p> |
| <p>(IT50) In this last three years, this organisation has successfully updated existing internal work processes and operational methods that result in improvement of organisational effectiveness, efficiency, productivities, and performance.</p> | <p>Adapted from Caird et al. (2013) Open2-Innovation Tool: Have your organisation introduced minor or major modifications to existing systems and organisational practices, or re-engineering to improve performance, efficiency, standards, values and other success outcomes.</p> <p>EU Community Innovation Survey (2014): During the three years 2012 to 2014, did your enterprise introduce: New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing.</p> |
| <p>(IT51) In the last three years, this organisation has routinely conducted users' satisfactory surveys measuring the organisational performances and successfully utilised the results to improve existing operations and practices.</p> | <p>Adapted from Nordic MEPIN pilot survey (2009): Does your organisation measure the impact of its innovations via user surveys and staff surveys?</p> <p>Wolk et al. (2009): Surveys serve as tools for measuring beneficiary or staff satisfaction, assessing progress toward a particular short-term</p> |

| Item statements | Reference and rationale |
|---|---|
| | goal, or soliciting opinions from stakeholders about new programs and activities that are under consideration. |
| (IT52) This organisation has effective and efficient performance measurement system in place (e.g. balanced scorecard, management dashboard, report card, and KPI trackings etc.) that are utilised and followed-through by all employees in order to monitor and ensure that the mission and vision of success are linked and translated to actual organisational unit activities and operations. | Adapted from Wolk et al. (2009): With the right performance metrics, data, and analysis in hand, social innovators, nonprofit organisations, government agencies, and businesses that offer innovative, results-driven solutions to social problems can make well-informed management decisions to drive continuous improvement and long-term social impact. |
| (IT53) In the last three years, this organisation has effectively and efficiently utilised independent, and impartial <i>internal audit department</i> that constantly monitors, evaluates, and provides feedbacks and recommendations to improve daily operations and performance of all organisational division units. | Adapted from Wolk et al. (2009): Performance measurement can help turn assumptions into well understood facts and show the way to improvements that lead to better and more effective business operational model. Peter Drucker: “Efficiency is doing things right. Effectiveness is doing the right things” |
| (IT54) In the last three years, this organisation has been successfully complied to independent and impartial <i>external audit and/or panel of experts</i> that evaluates its targets, KPIs and performance. | Adapted from Wolk et al. (2009): Performance measurement can help turn assumptions into well understood facts and show the way to improvements that lead to better and more effective business operational model. |
| (IT55) This organisation establishes and able to maintain good <i>national</i> | Adapted from Caird et al. (2013): Linkages and entrepreneurship: |

| Item statements | Reference and rationale |
|--|---|
| <p>collaborative networks and research cooperation with other innovative organisations.</p> | <p>Does your organisation support... Inter-company collaborations with innovative organisations? Linkages with customer/user groups or user communities?</p> <p>Nordic MEPIN pilot survey (2009): Has your organisation cooperated with others for its innovative activities?</p> <p>EU Community Innovation Survey (2014): During the three years 2012 to 2014, did your enterprise cooperate on any of your innovation activities with other enterprises or organisations?</p> <p>UK Public Sector Innovation (NESTA, 2011): Attitude to collaboration.</p> |
| <p>(IT56) This organisation establishes and able to maintain good <i>international</i> collaborative networks and research cooperation with other innovative organisations.</p> | <p>Adapted from Caird et al. (2013): Linkages and entrepreneurship: Does your organisation support... Inter-company collaborations with innovative organisations? Linkages with customer/user groups or user communities?</p> <p>Nordic MEPIN pilot survey (2009): Has your organisation cooperated with others for its innovative activities? Please indicate whether any of the cooperation partners were located in other countries?</p> |
| <p>(IT57) This organisation engages with and benefits from cross-sectoral collaborative partnerships with other public agencies, private business enterprises, universities and non-profit organisations.</p> | <p>Nordic MEPIN pilot survey (2009): Indicate how important of the following cooperation partner to your innovation activities; Enterprises (as suppliers, clients/ users).</p> |

| Item statements | Reference and rationale |
|--|--|
| | Public organisations (as suppliers, clients/users), universities, government research institutes, other public organisations. Citizens (as users or others). |
| <p>(IT58)</p> <p>This organisation fully benefits from national and/or local government policies and regulations that promote innovations and innovation related activities.</p> <p>(Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units).</p> | <p>Nordic MEPIN pilot survey (2009),</p> <p>Barriers to innovation:</p> <p>How important were the following factors for hampering your innovation activities or projects or influencing a decision not to innovate?</p> <p>Lack of flexibility in laws and regulations.</p> <p>Lack of incentives for organisations as a whole to be innovative.</p> <p>UK Public Sector Innovation (NESTA, 2011), Wider sector conditions for innovation: Government regulations towards innovation, autonomy legislative basis, and freedom to use rules and guidance.</p> |
| <p>(IT59)</p> <p>This organisation is consistently able to receive external financial supports, from the national and/or local governments and/or private businesses or foundations to invest in innovations and innovation related activities.</p> <p>(Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units).</p> | <p>Nordic MEPIN pilot survey (2009):</p> <p>Has your organisation received any financial supports for its innovation activities?</p> <p>From local or regional authorities.</p> <p>From central government</p> <p>From the European Union.</p> <p>From private business or foundations?</p> <p>EU Community Innovation Survey (2014):</p> <p>During the three years 2012 to 2014, did your enterprise receive any public financial support for innovation activities from the following levels of government?</p> <p>Local or regional authorities</p> <p>Central government (including central government agencies or ministries)</p> <p>The European Union (EU).</p> |
| (IT60) | Adapted from |

| Item statements | Reference and rationale |
|--|--|
| Government policies, laws and regulations, and political mandates and climates help foster innovation and innovation related activates in this organisation. | Nordic MEPIN pilot survey (2009): How important were the following driving forces to your organisation activities? Political forces, mandated changes in budget, new laws or regulations, new policy priorities. |

2.5 Decision Support Systems (DSS)

A decision support systems (DSS) is a tool to assist decision makers in complex decision-making processes which can be a computer program application that analyses business data and presents it so that users can make business decisions more easily. It is an informational application (to distinguish it from an operational application that collects the data in the course of normal business operation) (Rouse, 2010). DSS serve the management, operations and planning levels of an organisation (usually mid and higher management) and help people make decisions about problems that may be rapidly changing and not easily specified in advance i.e. unstructured and semi-structured decision problems. DDS can be either fully computerised or human-powered, or a combination of both. A decision support system may present information graphically and may include an expert system or artificial intelligence (AI). It may be aimed at business executives or some other group of knowledge workers (Rouse, 2010).

DDS can assist in rational and strategic planning in a public organisation. Rationale planning is a theoretical framework of strategic management that centers on a rational approach to strategy formulation through strategic planning and strategy implementation through performance measurement and performance management (George & Desmidt, 2018; Andrews et al. 2009; Poister, Pitts, & Edwards, 2010). Key to interests in the rational planning in public sector is the assumption that it contributes to strategic-decision quality by offering a counterweight to political or intuitive decision making (Boyne, 2001; Walker et al., 2010).

However, DDS usage in public sector has been lagging behind in comparison to private sector (Nutt, 2006; Boselli et al., 2011). This could be because private sector managers are more apt to support budget decisions made with analysis

and less likely to rely on bargaining. Public sector managers are less likely to support budget decisions backed by analysis and more likely to support those that are derived from bargaining with agency people. Apart from this, public organisations have multiple goals, which can be vague, controversial, or both (Baker, 1969 and Bozeman, 1984). Goal ambiguity makes performance outcomes unclear for public sector organisations.

Comparison of decision making characteristics in private and public sectors as discussed by Bencina (2007) are summarised in Table 2.9.

**Table 2.8: Comparison of decision making characteristics
in private and public sectors**

| Private Sector | Public Sector |
|--|---|
| Decisions are made by a single agent (individual manager or management team) whose authority is defined by a hierarchical organisation structure. | Decisions are not made but happen as a result of a complex interaction between administrators, trade unions, pressure groups, etc. |
| Decisions are dominated by a single interest, typically the competitive position of the company. | Decisions involve many and often divergent interests of a society, and aggregation into such notions as general welfare only masks the conflict |
| Decision alternatives are evaluated on the basis of a limited set of quantitative economic criteria such as market share, bottom line profit or shareholder value. | The set of evaluation criteria is large and has a wide variety of both quantitative and qualitative criteria, whose values are difficult to establish and/or aggregate. |
| Decisions typically have a planning horizon of months to at most several years (e.g. new products and markets). | Decisions have a planning horizon of several decades (e.g. decisions on infrastructure). |

Decision support systems are often demanding in terms of modelling and use, while purchasing software can also represent too large an investment for many organisations. The level of maturity of an organisation influences the use (or non-use) of methods and tools for decision support, which is definitely lower in the public sector

than in the commercial sector. The public sector uses considerable assets in its operation and investments, and therefore good decisions are of crucial importance for further development (at state, regional and local levels). Desirable features of a decision support system include simple to use web-based software that can be accepted in organisations and environments less inclined to use a systematic approach to decision making (Bencina, 2007).

2.6 System Development Life Cycle (SDLS)

System Development Life Cycle (SDLS) enables users to transform a newly developed project into an operational one. SDLS is a multistep, iterative process, structured in a methodical way. This process is used to model or provide a framework for technical and non-technical activities to deliver a quality system which meets or exceeds a business expectations or manage decision-making progression. Traditionally, the systems-development life cycle consisted of five stages. That has now increased to seven phases. Increasing the number of steps helped systems analysts to define clearer actions to achieve specific goals (source: www.innovativearchitects.com).

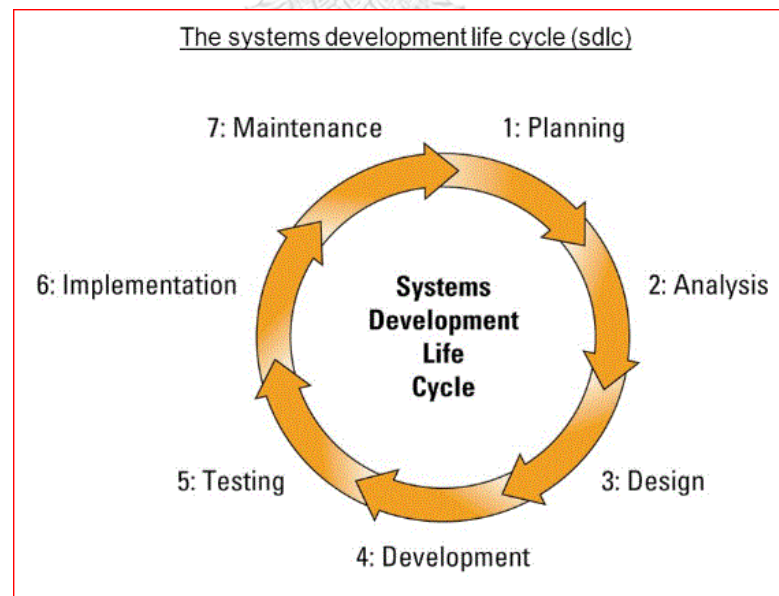


Figure 2.7: The seven phases of the System Development Life Cycle (SDLC)

Source: <http://study-aids.co.uk/dissertation-blog/system-development-life-cycle-sdlc/>

Similar to a project life cycle (PLC), the SDLC uses a systems approach to describe a process. It is often used and followed when there is an IT or IS project under development. The SDLC highlights different stages (phases or steps) of the development process. The life cycle approach is used so users can see and understand what activities are involved within a given step. Steps can be repeated at any time or a previous step can be reworked when needed in order to modify or improve the system. The seven phases of system development life cycle (SDLS) diagram is shown in Figure 2.7.

Phase 1: Planning

This is the first phase in the systems development process. It identifies whether or not there is the need for a new system to achieve a business strategic objectives. This is a preliminary plan (or a feasibility study) for a company business initiative to acquire the resources to build on an infrastructure to modify or improve a service. The company might be trying to meet or exceed expectations for their employees, customers and stakeholders too. The purpose of this step is to find out the scope of the problem and determine possible solutions. Resources, costs, time, benefits and other items should be considered at this stage.

Phase 2: Systems Analysis and Requirements

The second phase is where businesses will work on the source of their problem or the need for a change. In the event of a problem, possible solutions are submitted and analysed to identify the best fit for the ultimate goal(s) of the project. This is where the teams consider the functional requirements of the project or solution. It is also where system analysis (or analysing the needs of the end users) takes place to ensure the new system can meet their expectations. Systems analysis is vital in determining what the business needs are, as well as how they can be met, who will be responsible for the individual pieces of the project, and what sort of timeline should be expected. There are several tools businesses can use that are specific to the second phase such as CASE (Computer Aided Systems/Software Engineering), requirements gathering, and structured analysis.

Phase 3: Systems Design

The third phase describes, in detail, the necessary specifications, features and operations that will satisfy the functional requirements of the proposed system which will be in place. This is the step for end users to discuss and determine their specific business information needs for the proposed system. It is during this phase that they will consider the essential components (hardware and/or software) structure (networking capabilities), processing and procedures for the system to accomplish its objectives.

Phase 4: Development

The fourth phase is when the real work begins in particular, when a programmer, network engineer and/or database developer are brought on to do the major work on the project. This work includes using a flowchart to ensure that the process of the system is properly organised. The development phase marks the end of the initial section of the process. Additionally, this phase signifies the start of the production. The development stage is also characterised by instillation and change. Focusing on training can be a huge benefit during this phase.

Phase 5: Integration and Testing

The fifth phase involves systems integration and system testing (of programs and procedures) which are normally carried out by a Quality Assurance (QA) professional in order to determine if the proposed design meets the initial set of business goals. Testing may be repeated, specifically to check for errors, bugs and interoperability. This testing will be performed until the end user finds it acceptable. Another part of this phase is verification and validation, both of which will help ensure successful completion of the program.

Phase 6: Implementation

The sixth phase is when the majority of the code for the program is written. Additionally, this phase involves the actual installation of the newly developed system. This step puts the project into production by moving the data and components from the old system and placing them in the new system via a direct cutover. While this can be

a risky (and complicated) move, the cutover typically happens during off-peak hours, thus minimizing the risk. Both the system analysts and the end users should now see the realisation of the project that has implemented changes.

Phase 7: Operations and Maintenance

The seventh and final phase involves maintenance and regular required updates. This step is when the end users can fine-tune the system, if they wish, to boost performance, add new capabilities or meet additional user requirements.

If a business determines a change is needed during any phase of the SDLC, the company might have to proceed through all the above life cycle phases again. The life cycle approach of any project is a time consuming process. Even though some steps are more difficult than others, none are to be overlooked. An oversight could prevent the entire system from functioning as planned.

2.7 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is an information systems theory proposed by Davis (1989) and Davis, Bagozzi, & Warshaw (1989) to predict and explain how users come to accept and use a technology. TAM was developed under contract with IBM Canada in the mid-1980s where it was used to evaluate the market potential for a variety of then-emerging PC-based applications in the area of multi-media, image processing, and pen-based computing in order to guide investments in new product development (Davis & Venkatesh, 1996).

TAM is an adaptation of the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) that was designed to understand the causal chain linking external variables to its user acceptance and actual use in a workplace. External variables such as objective system design characteristics, training, computer self-efficacy, user involvement in design, and the nature of the implementation process are theorized to influence behavioural intention to use, and ultimately usage, indirectly via their influence on perceived usefulness and perceived ease of use.

Perceived usefulness is defined by Davis (1989) and Davis et al. (1989) as the degree to which a person believes that using a particular system would enhance his or her job performance.

Perceived ease-of-use is defined by Davis (1989) and Davis et al. (1989) as the degree to which a person believes that using a particular system would be free from effort.

Behavioural intention to use is the user's intention to use the new application that is determined by one's attitude towards using it. This attitude in turn is determined by two specific beliefs perceived usefulness and perceived ease of use (Davis & Venkatesh, 1996).

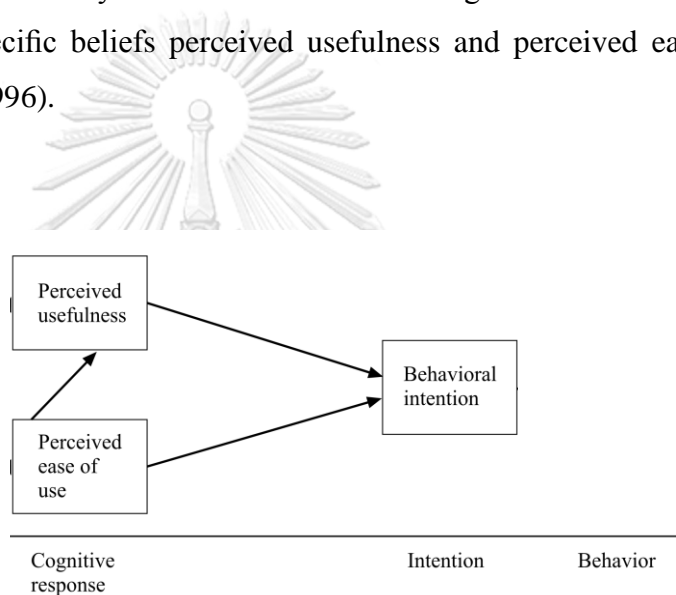


Figure 2.8: Technology Acceptance Model (TAM) factors used in this research adapted from Source: (Fred D. Davis & Venkatesh, 1996)

TAM model suggests that when users are presented with a new information technology, a number of factors such as perceived usefulness and perceived ease of use can influence their decision about how and when they will use it as shown in Figure 2.8. TAM is widely used by researchers and practitioners to predict and explain user acceptance of information technologies because the scales have been confirmed to be reliable and valid in many cases (Davis & Venkatesh, 1996).

TAM was later expanded into the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) to include additional factors of performance expectancy, effort expectancy, and social influence that have a positive effect on behavioural intention. The effect of the predictors on behavioural intention is subject to moderator effects from gender, age, experience and voluntariness of use (Schaik, 2011). Behavioural intention and facilitating conditions have a positive effect on user behaviour. In this study, the TAM model and its construct scale were used to test the user acceptance of POINTinno.com – a new web-based application to measure organisational innovativeness in public agencies.

2.8 ASEAN community and key social and economic information

2.8.1 History of the Association of Southeast Asian Nations (ASEAN)

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967 in Bangkok, Thailand by the ASEAN Declaration (Bangkok Declaration) during the Vietnam War, with the support of the US that feared the spread of the communism in Southeast Asian countries. The original five ASEAN members were Thailand, Philippines, Malaysia, Indonesia and Singapore, which were all anti-communist nations. Later, Brunei joined on 7 January 1984 after its independence from the UK. ASEAN's position of anti-communism was considerably changed by Vietnam's joining to ASEAN on 28 July 1995. ASEAN became a general regional cooperation organisation for economy, sociocultural, and politics. Myanmar and Laos became members on 23 July 1997 and Cambodia on 30 April 1999, making a total of 10 member countries. The area map, capitals, and national flags of the ten ASEAN member countries are shown in Figure 2.9.

- To promote active collaboration and mutual assistance on matters of common interest in the economic, social, cultural, technical, scientific and administrative fields;
- To provide assistance to each other in the form of training and research facilities in the educational, professional, technical and administrative spheres;
- To collaborate more effectively for the greater utilisation of their agriculture and industries, the expansion of their trade, including the study of the problems of international commodity trade, the improvement of their transportation and communications facilities and the raising of the living standards of their peoples;
- To promote Southeast Asian studies; and
- To maintain close and beneficial cooperation with existing international and regional organisations with similar aims and purposes, and explore all avenues for even closer cooperation among themselves.

In their relations with one another, the ASEAN member states have adopted the following fundamental principles, as contained in the Treaty of Amity and Cooperation in Southeast Asia (TAC) of 1976:

- Mutual respect for the independence, sovereignty, equality, territorial integrity, and national identity of all nations;
- The right of every State to lead its national existence free from external interference, subversion or coercion;
- Non-interference in the internal affairs of one another;
- Settlement of differences or disputes by peaceful manner;
- Renunciation of the threat or use of force; and
- Effective cooperation among themselves.

The ASEAN Vision 2020, adopted by the ASEAN Leaders on the 30th Anniversary of ASEAN in 1997, agreed on a shared vision of ASEAN as a concert of Southeast Asian nations, outward looking, living in peace, stability and prosperity, bonded together in partnership in dynamic development and in a community of caring societies. At the 9th ASEAN Summit in 2003, the ASEAN Leaders resolved that an ASEAN Community shall be established. At the 12th ASEAN Summit in January 2007, the Leaders affirmed their strong commitment to accelerate the establishment of an ASEAN Community by 2015 and signed the Cebu Declaration on the Acceleration of the Establishment of an ASEAN Community by 2015.

The ASEAN Community comprises of three pillars, namely the ASEAN Political-Security Community, ASEAN Economic Community, and ASEAN Socio-Cultural Community. Each pillar has its own Blueprint, and, together with the Initiative for ASEAN Integration (IAI) Strategic Framework and IAI Work Plan Phase II (2009-2015), they form the Roadmap for an ASEAN Community 2009-2015. The ASEAN Charter entered into force on 15 December 2008 and serves as a firm foundation in achieving the ASEAN Community by providing legal status and institutional framework for ASEAN. It also codifies ASEAN norms, rules and values; sets clear targets for ASEAN; and presents accountability and compliance. With the entry into force of the ASEAN Charter, ASEAN will henceforth operate under a new legal framework and establish a number of new organs to boost its community-building process. In effect, the ASEAN Charter has become a legally binding agreement among the 10 ASEAN Member States.

ASEAN successfully joined together to form the ASEAN Community on 31 December 2015. At the 27th ASEAN Leader Summit in November 2015, ASEAN declared the ASEAN Vision 2025: Forging Ahead Together to chart the path for ASEAN Community building over the next ten years. It is a forward looking roadmap that articulates ASEAN goals and aspirations to realise further consolidation, integration and stronger cohesiveness as a Community. ASEAN is working towards a Community that is “politically cohesive, economically integrated, and socially responsible”. The ASEAN 2025 Document states that the ASEAN Community over the

next ten years would be guided by but not limited to the following broad goals that will further consolidate and strengthen the regional grouping:

- Greater emphasis on the peoples of ASEAN and their well-being;
- Enhance awareness of ASEAN and its Vision of a politically cohesive, economically integrated and socially responsible Community;
- Engage all nationals of ASEAN Member States through effective and innovative platforms to promote commitment and identification with ASEAN policies and regional interests;
- Ensure fundamental freedoms, human rights and better lives for all ASEAN peoples;
- Strengthen capacity to deal with existing and emerging challenges while maintaining ASEAN centrality;
- An outward-looking and global player;
- Implement the ASEAN agenda while pursuing national aspirations which contribute to ASEAN Community building; and
- Strengthen ASEAN Organs and the ASEAN Secretariat.

Key Elements of the ASEAN 2025 across the three pillars are as follows:

Political-Security Community

- A rules-based, people-oriented, people-centred ASEAN in a region of peace, stability and prosperity;
- A consolidated ASEAN Community;
- A dynamic, resilient and harmonious community able to effectively respond to social and economic vulnerabilities and other non-traditional security threats;
- A Community that can respond effectively to challenges affecting ASEAN from within and beyond the region;
- A Community that steadfastly maintains ASEAN centrality in regional mechanisms;

- Strengthened ASEAN unity and cohesiveness to protect its leading and central role in dealing with matters of common concern; and
- Enhanced dialogue and cooperation with ASEAN external partners for mutual benefit and interest.

Economic Community

- A well-integrated and connected economy within the global economic system;
- A business-friendly, trade-facilitative, market driven and predictable environment which inspires investor confidence;
- A region with a key role in global value chains and increasing participation in high value added and knowledge-based activities;
- A competitive and dynamic region that inspires innovation and where businesses of all sizes thrive, and where consumers' rights are protected;
- A community where the benefits from economic integration are equitably shared among and within ASEAN Member States, including with micro, small and medium enterprises, youth, and women entrepreneurs; and
- A connected region where improvements in transport linkages and infrastructure help peoples and businesses move efficiently and work more productively across borders, expand market reach and strategically source goods and services.

Socio-Cultural Community

- An inclusive Community that is people-oriented, people-centred and promotes a high quality of life and equitable access to opportunities for all, and engages relevant stakeholders in ASEAN processes;

- A sustainable Community that promotes social development and environmental protection through effective mechanisms to meet current and future needs of the peoples;
- A resilient Community with enhanced capacity to continuously respond and adapt to current challenges and emerging threats; and
- A dynamic, open, creative and adaptive Community with an ASEAN identity reflecting the region's collective personality, norms, values and beliefs as well as aspirations as one ASEAN Community.

2.8.2 Key social and economic information about ASEAN

The overall ASEAN key information about the indicators of socio-demography, economy and trade, and investment and connectivity in 2016 taken from the data compiled by the ASEAN Statistics Division (2017) are briefly discussed in this section and are shown in Table 2.10. The total land area of ASEAN is 4.5 million square km and the total population is 634.5 million or 8.7% of the world population. However, if include ASEAN+6 (China, Japan, South Korea, India, Australia, and New Zealand) the total population of ASEAN+6 becomes 3.5 billion or nearly half of the world population.

The ASEAN youth population (15-29 years old) is 160.2 million or around 25.2% of the total population, while the aging population (65 years and over) is 36.6 million or 5.8%. Therefore, overall ASEAN (especially in Indonesia and CLMV) have relatively high proportion of working-age group population in comparison to Japan super-aging society with 25.9% of population age 65 or over (Muramatsu & Akiyama, 2011), and the USA with 15% of population age 65 or over (International Business Review, 2018). The ASEAN urban population is 49%, the proportion of population below national poverty line, and the proportion of population below PPP\$1.25 is 14%. ASEAN member countries have unemployment rates of 1.0-6.9%. The average adult literacy rate is 94.9% with net enrollment of primary education from 88.0-100%, and wide range of net enrollment of secondary education from 34.7% in Lao PDR to 99.5% in Singapore.

Table 2.9: Overall ASEAN key indicators of socio-demography, economy and trade, and investment and connectivity in 2016

| SOCIO-DEMOGRAPHY | | ECONOMY AND TRADE | |
|--|-----------|--|---------|
| Land area (million sqkm) | 4.5 | Gross Domestic Product (GDP) | |
| Population (million) | 634.5 | GDP at current market prices (US\$ trillion) | 2.6 |
| Population density (persons per sqkm) | 141.3 | GDP as % of world GDP | 3.4 |
| Population as % world population | 8.7 | GDP per capita (US\$) | 4,033.9 |
| ASEAN+3 population (million) | 2,195.3 | GDP growth at constant price (%) | 4.8 |
| ASEAN+3 as % world population | 30.1 | ASEAN+3 GDP (US\$ trillion) | 20.1 |
| ASEAN+6 population (million) | 3,533.7 | ASEAN+3 as % of world GDP | 26.7 |
| ASEAN+6 as % world population | 48.4 | ASEAN+6 GDP (US\$ trillion) | 23.8 |
| Sex ratio (male per 100 female) | 99.4 | ASEAN+6 as % of world GDP | 31.6 |
| Persons below 5 years (million) | 57.2 | Trade in Goods | |
| Persons 65 years and over (million) | 36.6 | Total trade (US\$ billion) | 2,236.3 |
| Youth 15-29 years (million) | 160.2 | Total trade as % GDP | 87.4 |
| Urban population (%) | 49.0 | Exports of trade (US\$ billion) | 1,150.5 |
| Proportion of population below national poverty line (%) | 14.0 | Imports of trade (US\$ billion) | 1,085.9 |
| Proportion of population below PPP\$1.25 (%) | 14.0 | Balance of trade (US\$ billion) | 64.6 |
| Unemployment rate (%) | 1.0-6.9 | ASEAN +3 as % of world export | 27.5 |
| Adult literacy rate (%) | 94.9 | ASEAN +3 as % of world import | 22.7 |
| Net enrollment primary education (%) | 88.0-100 | ASEAN +6 as % of world export | 30.6 |
| Net enrollment secondary education (%) | 34.7-99.5 | ASEAN +6 as % of world import | 26.4 |
| Access to safe drinking water (%) | 81.0 | Ratio of trade compared with 5 years ago (%) | (6.8) |
| Access to improved sanitation (%) | 78.0 | Rate of growth of ASEAN trade (%) | (1.6) |
| Infant mortality rate (per 1000 live births) | 20.0 | Rate of growth of export (%) | (1.8) |
| Life expectancy (years) | 70.9 | Rate of growth of import (%) | (1.4) |
| INVESTMENT AND CONNECTIVITY | | Share of intra-ASEAN Trade (%) | 23.1 |
| Total FDI inflows (US\$ billion) | 98.0 | Trade balance with China (US\$ billion) | (81.0) |
| Rate of growth of FDI inflows (%) | (18.6) | Trade balance with Japan (US\$ billion) | (9.8) |
| Share of intra-ASEAN FDI (%) | 25.2 | Trade balance with ROK (US\$ billion) | (32.8) |
| Tourist arrival (million) | 113.1 | Trade in Services | |
| Rate of growth of tourist arrival (%) | 6.7 | Total trade in services (US\$ billion) | 643.4 |
| Share of intra-ASEAN tourist arrival (%) | 42.2 | Total trade in services as % GDP | 25.1 |
| Share of tourist arrival from +3 countries (%) | 26.8 | Exports of trade in services (US\$ billion) | 326.8 |
| Share of tourist arrival from USA (%) | 3.1 | Imports of trade in services (US\$ billion) | 316.6 |
| Share of tourist arrival from EU28 (%) | 8.8 | Balance of trade in services (US\$ billion) | 10.2 |
| Internet subscriber per 100 persons | 37.8 | Rate of growth of export (%) | 3.1 |
| Cellular phone per 100 persons | 144.9 | Rate of growth of import (%) | 0.7 |
| Road length (million km) | 1.6 | Share of intra-ASEAN trade in services (%) | 16.6 |
| Paved network (million km) | 0.9 | | |
| Total road vehicles per 1000 population | 320.4 | | |
| Railways passenger (million) | 1,931.9 | | |
| International air passenger traffic (million) | 220.2 | | |

Source: ASEAN Statistics Division (2017)

The ASEAN GDP is US\$2.6 trillion or 3.4% of the world GDP. Trade in goods is US\$ 2.2 trillion while trade in service is US\$ 643 billion. The total FDI inflow is US\$ 98 billion with share of infra-ASEAN FDI of 25.2%. The total number of tourist arrival is 113 million with 42% are from infra-ASEAN and 28% from +3 countries (China, Japan, and South Korea). The number of cellular phone per 100 persons is 144.9.

Table 2.10: ASEAN member countries key socio-demographic indicators in 2016

Source: ASEAN Statistics Division (2017)

| | Land area (Sqkm) | Population (000) | Population density (persons per sqkm) | Sex ratio (male per 100 female) | Persons below 5 years (000) | Persons 65 years and over (000) | Youth 15-29 years (000) | Urban population (%) | Proportion of population below national poverty line (%) | Proportion of population below PPP\$1.25 (%) |
|-------------------|------------------|------------------|---------------------------------------|---------------------------------|-----------------------------|---------------------------------|-------------------------|----------------------|--|--|
| Brunei Darussalam | 5,765.0 | 423.0 | 73.4 | 108.0 | 33.4 | 18.0 | 111.0 | 78.0 | NA | NA |
| Cambodia | 181,035.0 | 15,158.2 | 83.7 | 94.9 | 1,517.3 | 778.9 | 4,558.2 | 21.0 | 14.0 | 24.0 |
| Indonesia | 1,913,578.7 | 258,705.0 | 135.2 | 101.0 | 23,960.1 | 13,730.1 | 64,641.4 | 54.0 | 11.0 | 9.0 |
| Lao PDR | 236,800.0 | 6,621.1 | 28.0 | 100.0 | 695.6 | 280.5 | 2,008.2 | 40.0 | 17.0 | 29.0 |
| Malaysia | 331,388.0 | 31,633.5 | 95.5 | 106.9 | 2,632.7 | 1,913.0 | 9,304.7 | 75.0 | 1.0 | 0.0 |
| Myanmar | 676,576.0 | 52,917.0 | 78.2 | 92.7 | 4,938.0 | 3,126.0 | 13,603.0 | 35.0 | 23.6 | NA |
| Philippines | 300,000.0 | 103,242.9 | 344.1 | 101.8 | 11,367.0 | 5,102.4 | 28,457.7 | 44.0 | 22.0 | 19.0 |
| Singapore | 719.2 | 5,607.3 | 7,796.6 | 96.3 | 187.2 | 487.6 | 780.7 | 100.0 | NA | NA |
| Thailand | 513,119.5 | 67,454.7 | 131.5 | 95.5 | 3,815.6 | 7,439.2 | 13,851.3 | 52.0 | 14.0 | 18.0 |
| Viet Nam | 331,230.8 | 92,695.1 | 279.9 | 97.3 | 7,712.7 | 7,394.5 | 20,694.4 | 34.0 | 7.0 | 17.0 |

| | Unemployment rate (%) | Adult literacy rate (%) | Net enrollment primary education (%) | Net enrollment secondary education (%) | Access to safe drinking water (%) | Access to improved sanitation (%) | Infant mortality rate (per 1000 live births) | Life expectancy (years) |
|-------------------|-----------------------|-------------------------|--------------------------------------|--|-----------------------------------|-----------------------------------|--|-------------------------|
| Brunei Darussalam | 6.9 | 97.2 | 97.4 | 97.0 | 100.0 | 86.7 | 8.8 | 77.4 |
| Cambodia | 1.0 | 80.7 | 93.5 | 35.7 | 59.2 | 61.8 | 27.0 | 69.1 |
| Indonesia | 5.6 | 95.9 | 96.7 | 73.9 | 71.0 | 62.1 | 22.2 | 70.9 |
| Lao PDR | 3.6 | 84.7 | 95.2 | 34.7 | 61.4 | 73.2 | 57.0 | 68.0 |
| Malaysia | 3.4 | 94.9 | 98.1 | 68.5 | 95.1 | 99.5 | 6.9 | 74.8 |
| Myanmar | 4.0 | 89.6 | 94.5 | 57.3 | 80.0 | 80.0 | 39.0 | 69.4 |
| Philippines | 5.5 | 96.5 | 92.6 | 60.9 | 86.0 | 94.0 | 23.0 | 70.4 |
| Singapore | 3.0 | 97.0 | 100.0 | 99.5 | 100.0 | 100.0 | 1.7 | 82.9 |
| Thailand | 1.0 | 96.1 | 88.0 | 83.4 | 97.0 | 100.0 | 6.2 | 74.3 |
| Viet Nam | 2.1 | 95.0 | 99.0 | 83.1 | 93.0 | 83.6 | 14.7 | 73.4 |

Indonesia has the highest population of over 258 million, followed by Philippines (103 million), Vietnam (92 million), Thailand (67 million), Myanmar (53 million), Malaysia (31 million), Cambodia (15 million), Lao PDR (6.6 million), Singapore (5.6 million), and Brunei Darussalam (0.4 million).

Table 2.11: ASEAN member countries key economy and trade indicators in 2016

Source: ASEAN Statistics Division (2017)

| | GDP at current market prices (US\$m) | GDP per capita (US\$) | GDP growth at constant price (%) | Share of services sectors in GDP (%) | Inflation rate (%) end of period | Trade in goods - export (US\$m) | Trade in goods - import (US\$m) | Trade in goods - balance (US\$m) |
|-------------------|--------------------------------------|-----------------------|----------------------------------|--------------------------------------|----------------------------------|---------------------------------|---------------------------------|----------------------------------|
| Brunei Darussalam | 11,206.4 | 26,492.7 | (2.5) | 37.3 | (0.7) | 4,873.8 | 2,670.2 | 2,203.6 |
| Cambodia | 19,194.1 | 1,266.3 | 6.9 | 42.6 | 3.9 | 10,073.1 | 12,371.0 | (2,297.9) |
| Indonesia | 931,216.2 | 3,599.5 | 5.0 | 46.6 | 3.0 | 145,186.2 | 135,652.8 | 9,533.4 |
| Lao PDR | 15,903.3 | 2,401.9 | 7.0 | 40.2 | 1.6 | 3,124.2 | 4,107.1 | (982.9) |
| Malaysia | 299,632.2 | 9,463.9 | 4.2 | 53.0 | 2.1 | 189,414.3 | 168,392.3 | 21,022.0 |
| Myanmar | 68,636.2 | 1,297.1 | 5.7 | 41.6 | 5.9 | 11,509.3 | 15,695.7 | (4,186.4) |
| Philippines | 311,452.5 | 3,016.7 | 6.9 | 57.5 | 1.8 | 56,312.9 | 85,935.1 | (29,622.2) |
| Singapore | 296,977.4 | 52,962.6 | 2.0 | 73.7 | (0.5) | 338,083.2 | 291,909.4 | 46,173.8 |
| Thailand | 407,048.0 | 6,034.4 | 3.2 | 57.6 | 0.2 | 215,326.6 | 194,667.5 | 20,659.1 |
| Viet Nam | 198,196.3 | 2,138.2 | 6.2 | 43.6 | 2.7 | 176,575.1 | 174,463.4 | 2,111.7 |

| | Rate of growth of goods - export (%); (2015-2016) | Rate of growth of goods - import (%); (2015-2016) | Share of intra-ASEAN trade in goods (%) | Trade in services export (US\$m) | Trade in services import (US\$m) | Rate of growth of services - export (%); (2015-2016) | Rate of growth of services - import (%); (2015-2016) |
|-------------------|---|---|---|----------------------------------|----------------------------------|--|--|
| Brunei Darussalam | (23.3) | (17.5) | 33.2 | 530.5 | 1,644.6 | (18.5) | (0.8) |
| Cambodia | 17.7 | 4.9 | 24.4 | 4,458.3 | 1,951.6 | 12.7 | 2.5 |
| Indonesia | (3.4) | (4.9) | 24.4 | 23,478.2 | 30,521.3 | 5.7 | (1.3) |
| Lao PDR | 4.7 | 8.7 | 63.7 | 831.0 | 619.2 | (1.6) | (3.6) |
| Malaysia | (4.9) | (4.3) | 27.1 | 35,270.6 | 39,872.6 | 1.2 | (0.6) |
| Myanmar | (0.8) | (6.8) | 34.0 | 3,779.4 | 2,899.5 | (1.9) | 18.9 |
| Philippines | (4.0) | 22.4 | 21.7 | 31,357.2 | 24,232.7 | 7.9 | 2.6 |
| Singapore | (5.5) | (5.3) | 25.7 | 149,647.1 | 155,585.9 | 0.7 | 0.7 |
| Thailand | 0.4 | (4.0) | 23.0 | 65,244.6 | 42,778.4 | 5.6 | 0.6 |
| Viet Nam | 9.0 | 5.3 | 11.7 | 12,228.0 | 16,477.0 | 9.2 | 2.3 |

Indonesia has highest GDP at current market prices of US\$931 billion, followed by Thailand (US\$407 billion), Philippines (US\$311 billion), Malaysia (US\$299 billion), Singapore (US\$296 billion), Vietnam (US\$198 billion), Myanmar (US\$68 billion), Cambodia (US\$19 billion), Lao PDR (US\$15 billion), and Brunei Darussalam (US\$11 billion).

When comparing GDP per capita, Singapore has the highest GDP per capita of US\$52,900, followed by Brunei Darussalam (US\$26,400), Malaysia (US\$9,460), Thailand (US\$6,034), Indonesia (US\$3,600), Philippines (US\$3,016), Lao PDR (US\$2,401), Vietnam (US\$2140), Myanmar (US\$1,297), and Cambodia (US\$1,266).

Table 2.12: ASEAN member countries key investment and connectivity indicators in 2016

(Source: ASEAN Statistics Division (2017))

| | Total FDI inflows (US\$m) | Rate of growth of FDI inflows (%) | Share of intra-ASEAN FDI (%) | Tourist arrival (000) | Rate of growth of tourist arrival (%) | Share of intra-ASEAN tourist arrival (%) | Share of tourist arrival from +3 countries (%) | Share of tourist arrival from USA (%) | Share of tourist arrival from EU-28 (%) |
|-------------------|---------------------------|-----------------------------------|------------------------------|-----------------------|---------------------------------------|--|--|---------------------------------------|---|
| Brunei Darussalam | (150.4) | (187.8) | 43.0 | 218.8 | 0.3 | 54.4 | 20.2 | 1.7 | 8.7 |
| Cambodia | 2,279.7 | 34.0 | 27.9 | 5,000.0 | 5.0 | 43.9 | 26.9 | 4.6 | 12.8 |
| Indonesia | 3,520.8 | (78.8) | 277.5 | 12,024.0 | 15.5 | 37.1 | 21.1 | 2.7 | 11.3 |
| Lao PDR | 1,075.7 | (0.3) | 18.3 | 4,239.0 | (9.5) | 76.6 | 15.4 | 1.3 | 3.7 |
| Malaysia | 11,328.8 | 11.3 | 18.2 | 26,757.4 | 4.0 | 74.4 | 10.0 | 0.9 | 3.8 |
| Myanmar | 2,989.5 | 5.8 | 56.3 | 2,902.0 | (38.0) | 37.7 | 48.2 | 1.5 | 4.3 |
| Philippines | 7,933.1 | 40.7 | 6.7 | 5,967.0 | 11.3 | 9.0 | 43.4 | 14.5 | 8.3 |
| Singapore | 53,912.2 | (13.7) | 10.7 | 16,404.0 | 7.7 | 37.7 | 22.8 | 3.3 | 8.6 |
| Thailand | 2,553.2 | (68.2) | 68.9 | 29,530.5 | 9.8 | 26.4 | 35.8 | 2.9 | 12.8 |
| Viet Nam | 12,600.0 | 6.8 | 18.3 | 10,012.7 | 26.0 | 16.4 | 44.9 | 4.6 | 10.2 |

| | Internet subscriber per 100 persons | Cellular phone per 100 persons | Road length (km) | Paved network (km) | Total road vehicles per 1000 population | Railways passenger (million) | International air passenger traffic (000) |
|-------------------|-------------------------------------|--------------------------------|------------------|--------------------|---|------------------------------|---|
| Brunei Darussalam | 75.0 | 120.7 | 2,999 | 2,805 | 704.7 | n.a | 1,717.0 |
| Cambodia | 25.6 | 124.9 | 54,541 | 6,901 | 30.3 | - | 6,201.0 |
| Indonesia | 25.4 | 149.1 | 523,974 | 301,385 | 465.2 | 351.0 | 10,377.0 |
| Lao PDR | 21.9 | 55.4 | 58,886 | 10,395 | 278.7 | 0.3 | 944.0 |
| Malaysia | 78.8 | 141.2 | 205,787 | 156,692 | 843.4 | 2.2 | 39,984.2 |
| Myanmar | 25.1 | 89.3 | 136,102 | 48,056 | 115.8 | 42.6 | 4,027.0 |
| Philippines | 55.5 | 109.2 | 32,633 | 28,919 | 85.7 | 298.0 | 17,168.1 |
| Singapore | 81.0 | 146.9 | 3,496 | 3,496 | 170.6 | 1,195.4 | 58,158.0 |
| Thailand | 47.5 | 172.6 | 234,754 | 190,805 | 535.5 | 30.6 | 68,417.0 |
| Viet Nam | 46.5 | 128.0 | 326,000 | 216,000 | 173 | 11.8 | 13,203.0 |

The total FDI inflows show that in 2016 Singapore has the highest total FDI inflows at US\$53.9 billion, followed by Vietnam (US\$12.6 billion), Malaysia (US\$11.3 billion), Philippines (US\$7.9 billion), Indonesia (US\$3.5 billion), Myanmar (US\$3.0 billion) Thailand (US\$2.6 billion), Cambodia (US\$2.3 billion), Lao PDR (US\$1.1 billion), and Brunei Darussalam (US\$ -0.15 billion).

2.9 Composite indices of competitiveness and innovation rankings of ASEAN

The world most well-known and renowned composite indices that can be used to benchmark the competitiveness and innovativeness of ASEAN member countries are (1) The World Economic Forum (WEF) Global Competitiveness Index (GCI) in 2017-2018 (World Economic Forum, 2017) and (2) Global Innovation Index (GII) (Cornell, INSEAD, WIPO, 2018).

The obtained POINT Index Scores of the ten ASEAN member countries can be compared to these indices and their sub-indices on innovation in order to determine the accuracy of the predictions of POINTinno.com application even though the three indices were developed to measure different aspects of national innovation capability and performance.

The rationales and conceptual measurement frameworks of these two indices are described in more details as follows:

2.9.1 World Economic Forum (WEF) Global Competitiveness Index (GCI)

The World Economic Forum (WEF) Global Competitiveness Index (GCI) in 2017-2018 (World Economic Forum, 2017) presents a framework and a corresponding set of indicators to measure national key performance indicators in the three principal categories of growth and development, inclusion, and intergenerational equity and sustainability of 137 economies. The GCI rankings can be used to compare productivity and have been found to determine long-term economic growth at the national level. The GCI Index comprises of 3 groups of sub-indices and 12 policy domains (pillars) as follows:

Sub-index A: Basic requirements

1st pillar: Institutions

2nd pillar: Infrastructure

3rd pillar: Macroeconomic environment

4th pillar: Health and primary education

Sub-index B: Efficiency enhancers

5th pillar: Higher education and training

6th pillar: Goods market efficiency

7th pillar: Labour market efficiency

8th pillar: Financial market development

9th pillar: Technological readiness

10th pillar: Market size

Sub-index C: Innovation and sophistication factors

11th pillar: Business sophistication

12th pillar: Innovation

The 12th pillar Innovation indicator comprises of 7 sub-indicators as follows:

12.01 Capacity for innovation

12.02 Quality of scientific research institutions

12.03 Company spending on R&D

12.04 University-industry collaboration in R&D

12.05 Government procurement of advanced technology products

12.06 Availability of scientists and engineers

12.07 PCT patents applications/million population.

The overall GCI rankings in 2017-2018 and the 12th pillar Innovation Index ranking of the ten ASEAN member countries are summarised in Table 2.13.

Table 2.13: Summary of the overall GCI and GII Innovation Indicator rankings in 2017-2018 of the ten ASEAN member states

| ASEAN Member State (AMS) | Overall GCI 2017-2018 Ranking | GCI Ranking among AMS | GCI Innovation Indicator | GCI Innovation Ranking among AMS |
|--------------------------|-------------------------------|-----------------------|--------------------------|----------------------------------|
| Brunei Darussalam | 46 | 5 | 80 | 7 |
| Cambodia | 94 | 8 | 110 | 9 |
| Indonesia | 36 | 4 | 31 | 3 |
| Lao PDR | 98 | 9 | 81 | 8 |
| Malaysia | 23 | 2 | 22 | 2 |
| Myanmar | N/A | 10 | N/A | 10 |
| Philippines | 56 | 7 | 65 | 5 |
| Singapore | 3 | 1 | 9 | 1 |
| Thailand | 32 | 3 | 50 | 4 |
| Vietnam | 55 | 6 | 71 | 6 |

The summary of the overall GCI rankings in 2017-2018 in Table 2.13 show that Singapore is by far the top country in ASEAN with the overall GCI ranking at 3rd out of 137 global economies, followed by Malaysia at 23rd, Thailand at 32nd, Indonesia at 36th, Brunei Darussalam at 46th, Vietnam at 55th, Philippines at 56th, Cambodia at 94th, and Lao PDR at 98th. Note that there was no result available for Myanmar.

The results of the innovation indicator showed that Singapore is by far the top country in ASEAN with the indicator ranking at 9th, followed by Malaysia at 22nd. Indonesia innovation indicator ranks at 31st and overtakes Thailand at 50th to rank at third in ASEAN. Philippines innovation indicator ranks at 65th, followed by Vietnam at 71st, Brunei Darussalam at 80th, Lao PDR at 81st, and Cambodia at 110th. Note that there was no result available for Myanmar.

2.9.2 Global Innovation Index (GII)

The Global Innovation Index (GII) project was launched by Professor Dutta at INSEAD in 2007 with the simple goal of determining how to find metrics and approaches that better capture the richness of innovation in society and go beyond such traditional measures of innovation as the number of research articles and the level of research and development (R&D) expenditures (Cornell, INSEAD, WIPO, 2018).

The rationales are that first innovation is important for driving economic progress and competitiveness, both for developed and developing economies. Many governments are putting innovation at the centre of their growth strategies. Second, the definition of innovation has broadened, it is no longer restricted to R&D laboratories and to published scientific papers. Innovation could be and is more general and horizontal in nature, and includes social innovations and business model innovations as well as technical ones.

GII was not meant to be the ultimate and definitive ranking of economies with respect to innovation because measuring innovation outputs and impacts remains difficult, hence great emphasis is placed on measuring the climate and infrastructure for innovation and on assessing related outcomes.

The measurement framework of the GII 2018 is shown in Figure 2.10

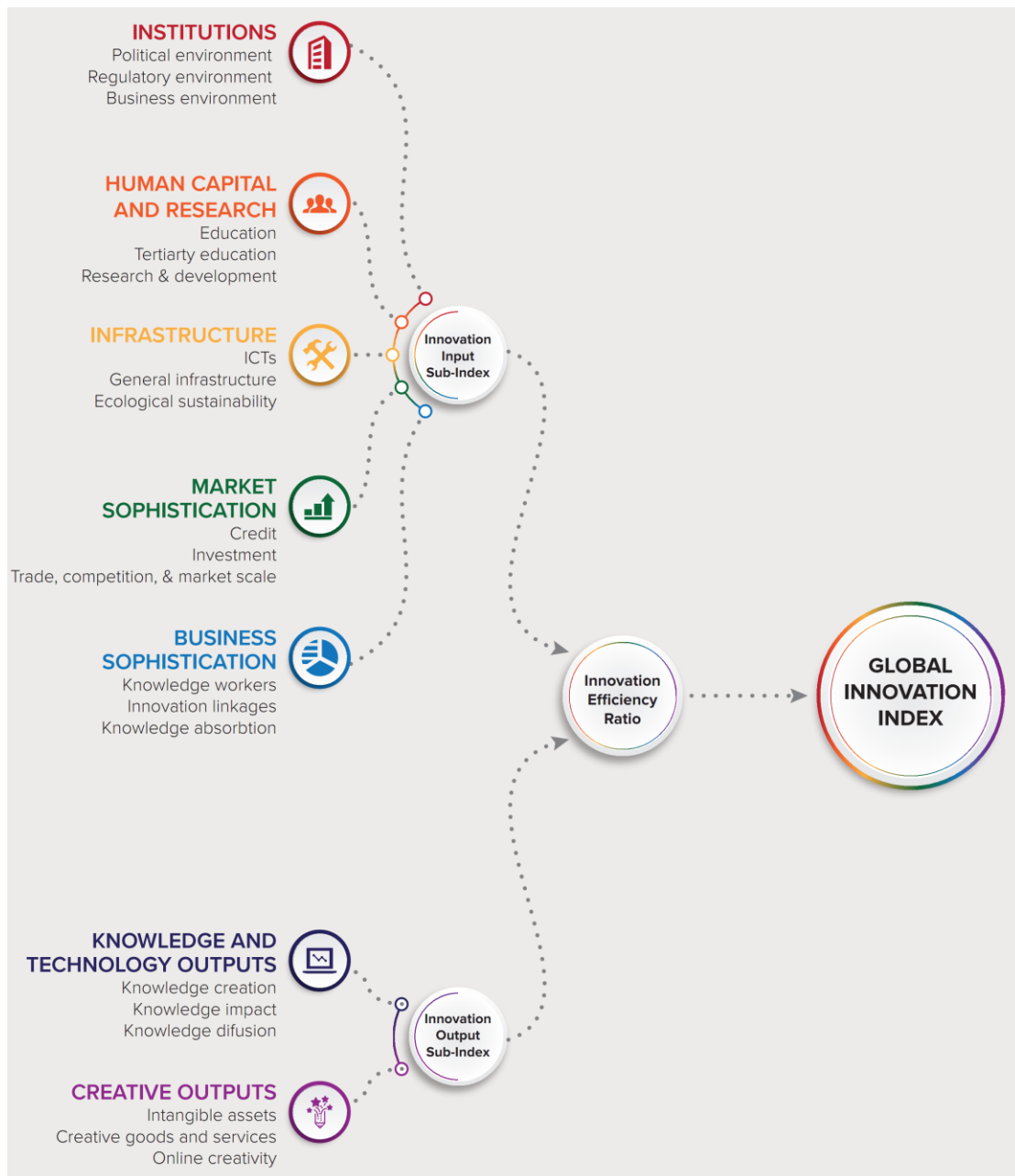


Figure 2.10: Measurement framework of the GII 2018

(Source: Global Innovation Index Report 2018, Cornell, INSEAD, WIPO, 2018)

The GII conceptual frameworks follows the IPO model on how innovation occurs and the four measurement indicators of GII are calculated as follows.

- (1) The overall GII score is the simple average of the Input and Output Sub-Index scores.
- (2) The Innovation Input Sub-Index is comprised of five input pillars that capture elements of the national economy that enable innovative activities: 1) Institutions, 2) Human capital and research, 3) Infrastructure, 4) Market sophistication, and 5) Business sophistication.
- (3) The Innovation Output Sub-Index provides information about outputs that are the results of innovative activities within the economy. There are two output pillars: 6) Knowledge and technology outputs and 7) Creative outputs.
- (4) The Innovation Efficiency Ratio is the ratio of the Output Sub-Index score to the Input Sub-Index score. It shows how much innovation output a given country is getting for its inputs.

The seven pillars in GII together form 80 indicators to measure the overall GII Score. A total of 57 variables are hard data; 18 are composite indicators from international agencies, and 5 are survey questions from the World Economic Forum's Executive Opinion Survey (EOS).

The GII government effectiveness indicator reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Scores are standardized. Therefore, this indicator is selected and compared to the POINT Index Scores obtained from this research study as well.

The comparison of the overall GII and the GII sub-index Government Effectiveness indicator of the ten ASEAN member countries are summarised in Table 2.14.

Table 2.14: Summary of the overall GII and GII Government Effectiveness indicator rankings in 2018 of the ten ASEAN member states

| ASEAN Member State (AMS) | Overall GII 2018 Ranking | GI I Ranking among AMS | GI I Government Effectiveness indicator | GI I Innovation Ranking among AMS |
|--------------------------|--------------------------|------------------------|---|-----------------------------------|
| Brunei Darussalam | 67 | 5 | 29 | 3 |
| Cambodia | 98 | 8 | 111 | 8 |
| Indonesia | 85 | 7 | 70 | 5 |
| Lao PDR | N/A | N/A | N/A | N/A |
| Malaysia | 35 | 2 | 38 | 2 |
| Myanmar | N/A | N/A | N/A | N/A |
| Philippines | 73 | 6 | 73 | 7 |
| Singapore | 5 | 1 | 1 | 1 |
| Thailand | 44 | 3 | 50 | 4 |
| Vietnam | 45 | 4 | 71 | 6 |

Table 2.14 shows that Singapore is by far the top country in ASEAN with the 5th rank of the overall GII score and ranked 1st in the world in the GII Government Effectiveness indicator out of 130 economies. Malaysia is ranked second in ASEAN from its 35th rank of the overall GII and 38th rank of the GII Government Effectiveness indicator. Thailand is ranked third in ASEAN from its 44th rank of the overall GII, followed by Vietnam at 45th rank. However, for the GII Government Effectiveness indicator ranking, Thailand (50th rank) was outranked by Brunei Darussalam (29th rank). It should be noted that the rankings of Lao PDR and Myanmar are not available for comparison.

The GII report 2018 concluded that ASEAN economies are making great progress in innovation indicators, yet with significant differences in performance. Singapore has the highest scores among ASEAN members in many of the selected indicators, excluding expenditure on education (topped again by Viet Nam), tertiary enrolment (where Thailand leads the ASEAN countries), gross capital formation (topped again by Brunei Darussalam), ICT service exports (topped again by the Philippines), and trademarks by origin (topped by Viet Nam this year).

CHAPTER 3

RESEARCH METHODOLOGY

This research project to measure organisational innovativeness (OI) of public agencies in ASEAN employs mixed research methodology of both qualitative research and quantitative research with the objectives to:

1. To review how organisational innovativeness has been measured and identify the important factors affecting organisational innovativeness of public agencies.
2. To develop and validate a suitable measurement framework model and indicators for measuring organisational innovativeness of public agencies in ASEAN.
3. To create an online web-based application (POINTinno.com) to adequately measure organisational innovativeness of public agencies.
4. To test how POINTinno.com is perceived by the potential users and assess its commercialisation potential.

The research methodology can be divided into 4 parts.

1. Literature review to compare how organisational innovativeness has been measured and to identify factors affecting organisational innovativeness
2. Develop and validate a suitable measurement framework model and indicators for measuring organisational innovativeness of public agencies in ASEAN.
3. Create POINTinno.com: a web-based online application for measuring organisational innovativeness of public agencies.
4. User acceptance trial of POINTinno.com and commercialisation potential assessment

Table 3.1: Overview of the research objectives, methodology, and outputs

| Objective | Methodology | Outputs |
|--|---|--|
| To identify factors affecting organisational innovativeness (OI) in public agencies. <i>(Objective no. 1)</i> | Literature review. | Factors affecting OI in public agencies. (Chapter 2) |
| To develop and validate suitable framework models and indicators for measuring OI of public agencies in ASEAN. <i>(Objective no. 2)</i> | Literature review. Qualitative in-depth interviews (n = 23). Content validation via IOC with experts (n = 12). Quantitative survey with public agencies in ASEAN (n = 290) Internal consistency validation via Cronbach's alpha coefficients. Multivariate statistical analysis (Factor analysis: EFA and CFA, SEM, and cluster analysis). | POINT measurement framework model (Figure 2.5) and POINT structural relationship framework model (Figure 2.6). (Chapter 2) Characteristics of target public agencies in ASEAN (Chapter 4) Proposed indicators or item statements for measuring OI based on literature review and in-depth interviews. (Chapter 2) Results of the Item-Objective-Congruence (IOC) with the experts. (Chapter 3) Results of the quantitative survey in ASEAN. (Chapter 5) Internal consistency of the questionnaire item statements. (Chapter 5) Results of the multivariate statistical analysis (Validations of the POINT models). (Chapter 5) |

| Objective | Methodology | Outputs |
|---|---|--|
| To create POINTinno.com: online web-based application for measuring OI. (Objective no. 3) | System development life cycle (SDLS) processes of POINTinno.com. | www.POINTinno.com online web-based application. (Chapter 6) |
| To test user acceptance of POINTinno.com and its commercialisation potential. (Objective no. 4) | Technology Acceptance Model (TAM) user test (n = 25). Commercialisation assessment. | User acceptance results. Commercialisation potential assessment results with possible future business model. (Chapter 7) |

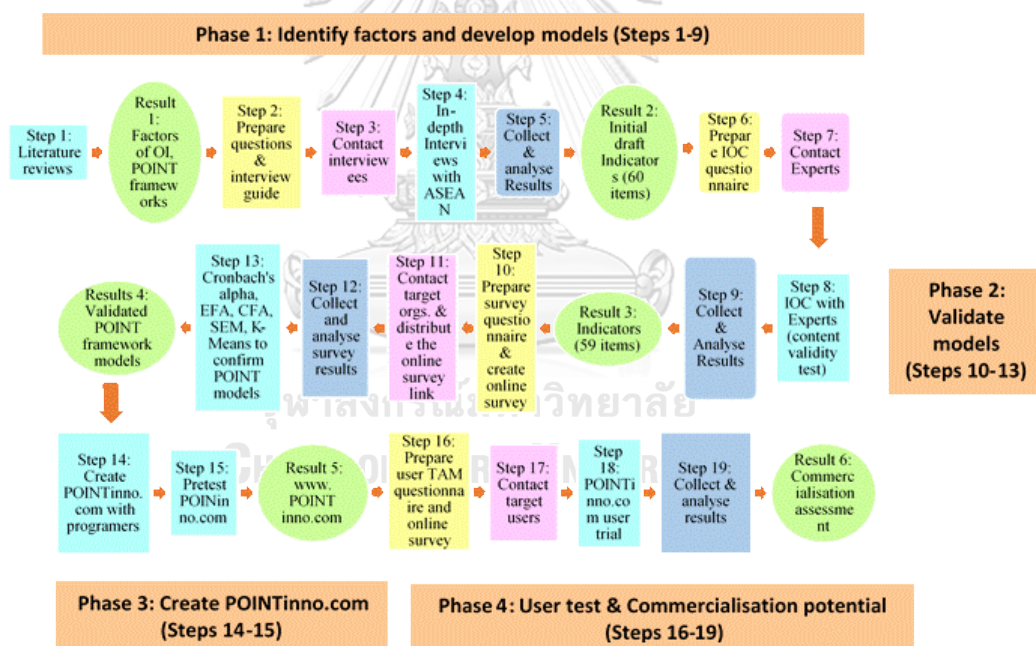


Figure 3.1: Diagram of steps involved in measuring public organisational innovativeness and developing POINTinno.com

3.1 Identify factors affecting organisational innovativeness

To compare how organisational innovativeness (OI) has been measured and identify the important factors affecting OI of public agencies (Research Objective no. 1), literature reviews and reference searches were used from the available databases of books, references, and online academic journals in the social science areas subscribed by Chulalongkorn University. The online databases searched include Science Direct, Scopus, Wiley Online Library, Springer Link, Elsevier, Emerald Management, and SAGE Journals Online. The keywords used were:

“organisation / organization” + “innovation” + “public sector”
 “organisation / organization” + “innovativeness” + “public sector”
 “innovative organisation” + “government” or “public sector”
 “organisation/ organisational innovativeness”
 “public sector innovation”
 “public agency innovation”
 “public organisation innovation”
 “administration innovation”
 “government innovation”
 “innovation measurement”
 “innovativeness measurement”

Most of the references found were in the topics of public administration, public policy, organisation theory, strategic management, business management, and human resource management.

3.2 Develop and validate the model and indicators for measuring organisational innovativeness

To develop and validate a suitable measurement framework model and indicators for measuring organisational innovativeness (OI) of public agencies in ASEAN (Research Objective no. 2), the following steps were taken.

3.2.1 Literature review to develop a conceptual model to measure OI and propose a structural relationship among the factors affecting OI

From the literature reviews of factor affecting organisational innovativeness (OI) and how public sector innovation and organisational innovativeness have been measured, a measurement framework model of POINT and a structural relationship model of the factor affecting OI are proposed as shown in Figure 2.5 and Figure 2.6 in Chapter 2. The assumptions are that the OI construct consists of eight distinct multidimensional components that are correlated and interlinked to one another and that the covariance among all of the item statements can be accounted for by a single overall OI factor or POINT index score.

The proposed structural relationship model of POINT in this study follows the input-process-output (I-P-O) of the system analysis concept similar to the Contingency Effectiveness Approaches by Daft et al., 2017 as well as how public sector innovation was measured in the previous frameworks developed by the Nordic MEPIN survey (CFA and DAMVAD, 2009; Bloch, 2013; Bloch, 2010; Mortensen, 2010; Jorgensen, 2010; Annerstedt & Bjorkbacka, 2010; and Bugge et al., 2011), and organisational innovativeness assessment from the Open2-Innova8ion web-based tool (Caird et al., 2013). The hypotheses are that F1: Culture, F2: Leadership, F3: Strategy, and F4: Workforce innovativeness factors together form the inputs & enablers factors affecting innovation activities at the start of the innovation process, whilst F7: Performance innovativeness is in the outputs and impacts factors resulting from the innovation related activities of the organisation. F6: Management innovativeness is the moderator between the inputs and outputs of the innovation process, whilst F5:

Resources and infrastructure and F8: Networks and external contexts innovativeness factors can affect innovation processes along all the stages of the I-P-O system.

3.2.2 Qualitative research In-depth interviews with selected experts representing the target public organisations in ASEAN with main mandates to promote STI

3.2.2.1 Population and sampling

The invited experts for the in-depth interviews (Appendix 1) were holding the positions of top executives, middle managements, and senior employees in the public/government agencies in the ten ASEAN member countries namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. The invited experts voluntarily gave comments about their organisational structure, functions, and innovation related activities. Their organisations have the main functions related to the promotion of STI development. The organisation levels can be at regional intergovernmental (ASEAN Secretariat) or at the ministry level, agencies under a ministry level, or a division/unit under an agency under a ministry level. The list of the 23 interviewees is shown in Table 3.2 below.

Table 3.2: List of the interviewees from the public organisations in ASEAN

| Country | Organisation | Position | No. |
|-------------------|---|---|------------|
| Brunei Darussalam | Ministry of Development (MOD) | <ul style="list-style-type: none"> ▪ Senior officer of the Policy coordination and strategic planning, MOD | 1 |
| Cambodia | Ministry of Industry and Handicraft (MIH) | <ul style="list-style-type: none"> ▪ Deputy Director of the Department of Science and Technology, MIH | 1 |
| Indonesia | Ministry of Research, Technology and Higher Education (RISTEK- DIKTI) | <ul style="list-style-type: none"> ▪ Director of the Research Center for the Development of Science and Technology | 1 |

| Country | Organisation | Position | No. |
|-------------|--|--|-----|
| | | (PAPPIPTEK-LIPI), RISTEK-DIKTI | |
| | The ASEAN Secretariat and the ASEAN COST | <ul style="list-style-type: none"> ▪ Previous Head of Science and Technology Cooperation (2009-2016) ▪ Head of Science and Technology Cooperation (2016 – present) ▪ Senior Officer | 3 |
| Lao PDR | Ministry of Science and Technology (MOST) | <ul style="list-style-type: none"> ▪ Director of the Science Division, MOST and National Representative of SCIRD ▪ Director of the International Cooperation Division Department of Planning and Cooperation, MOST | 2 |
| Malaysia | Ministry of Science, Technology and Innovation (MOSTI) | <ul style="list-style-type: none"> ▪ Senior Undersecretary, MOSTI and BAC Representative | 1 |
| | Sarawak Biodiversity Centre (SBC) | <ul style="list-style-type: none"> ▪ Chief Executive Officer, SBC | 1 |
| Myanmar | Ministry of Education (MOE) | <ul style="list-style-type: none"> ▪ Director of the Department of Higher Education, MOE and BAC Representative | 1 |
| Philippines | Department of Science and Technology (DOST) | <ul style="list-style-type: none"> ▪ Undersecretary for Research and Development, DOST and BAC Representative | 1 |
| Singapore | Agency for Science, Technology and Research (A*STAR) | <ul style="list-style-type: none"> ▪ Director of the International Relations and Partnerships Division, A*STAR and | |

| Country | Organisation | Position | No. |
|----------|---|---|-----|
| | | National COST Focal Point <ul style="list-style-type: none"> ▪ Assistant to the Director International Relations and Partnerships Division, A*STAR | 2 |
| Thailand | Ministry of Science and Technology (MOST) | <ul style="list-style-type: none"> ▪ Director of the International Cooperation Division, MOST and National COST Focal Point ▪ Senior foreign relation officer International Cooperation Division, MOST | 2 |
| | National Electronics and Computer Technology Center (NECTEC) | <ul style="list-style-type: none"> ▪ Senior Researcher Image Technology Lab NECTEC, NSTDA | 1 |
| | National Science Technology and Innovation Policy Office (STI Office) | <ul style="list-style-type: none"> ▪ Secretary General of STI Office ▪ Director of the Organization and System Development Division, STI Office ▪ Director of the Organization Management Division, STI Office ▪ Policy Specialist International Cooperation Division, STI Office | 4 |

| Country | Organisation | Position | No. |
|---------|--|---|-----|
| Vietnam | Ministry of Science and Technology (MOST) | <ul style="list-style-type: none"> ▪ Head of Division General Affairs and Multilateral Cooperation Division, Department of International Cooperation, MOST | 1 |
| | National Institute for Science and Technology Policy and Strategy Studies (NISTPASS) | <ul style="list-style-type: none"> ▪ Deputy Director of NISTPASS | 1 |
| Total | | | 23 |



3.2.2.2 Research instrument

The research instrument used is the semi-structure interview questionnaire to assess the organisational innovation and innovativeness of the selected public organisations in ASEAN. The Interview Guideline (Appendix 2) and the Interview Questions (Appendix 3) were sent to the interviewees before the interview appointment dates via email correspondences. The Interview Guideline covers the topics of the introduction to the research study, Background information and definitions of important terms, disclaimers, confidentiality, acknowledgements, and contact details. The interview questions are divided into three main parts that cover the following topics:

Part 1: Organisational structure, function and changes that impact the work processes and performance of the organisation

- Characteristics of innovative organisation.
- Management hierarchy and chain of decision and command in the organisation.
- Areas that can be improved to increase efficiency, effectiveness and capability in the organisational structure, hierarchy, manpower, HR management, resources and budgeting, KPI and performance audit, monitoring and evaluation processes and mechanism.

Part 2: Organisational Innovation and Innovativeness

- Any major changes in the past 5 years according to the proposed factors of organisational innovativeness and how these changes impact the organisation routines work processes, and performance.
- Importance assessment of the proposed factors affecting organisational innovativeness.

Part 3: Potential utilisation of the public organisational innovativeness assessment tool

- How the work progress and organisational performance has been monitored. Does the organisation use any strategy planning and

performance management tool to match the goals/objectives to quantitative target and KPI on an annual basis?

- If there is a reliable self-assessment web-based online tool that is easy to use and does not require detailed quantitative data inputs on your part but can adequately measure, compare, and assess the important factors affecting the organisational innovativeness of the organisation in comparison to other peer organisations nationally and internationally available, does the interviewee think that such tool will be useful?
- Will the interviewee consider using that tool?

3.2.2.3 Data collection

The interviewees were contacted by emails, phone, and/or social applications to participate in the in-depth interviews. The interviews took place from April 2015 to January 2018 during various meetings associated with the ASEAN COST projects and activities in Thailand, Cambodia, Vietnam, and Malaysia as shown in the Appendix 1: Table 9.1: Interview appointments with the public organisations in ASEAN. All of the interviews were face to face meetings except with Myanmar Ministry of Education that was conducted via a phone interview. The interviews lasted from 30 minutes to 2 hours and were recorded with voice recorder. After the interviews, the interviewees were contacted by emails to check and confirm the accuracy of the data regarding their organisational structures and relevant information. Data methodological triangulation is used to compare the information provided by the interviewees with the available data from the literature sources such as academic journals, published reports or papers, and cross-check (member checking) with other employees of the same organisation when possible. Some of the interviewees were contacted to confirm the latest updates on the changes of the management structures of their organisations.

3.2.2.4 Data analysis

The data from the interviewed were analysed and compared with different organisational levels at regional intergovernmental (ASEAN Secretariat, and the ASEAN COST: virtual network organisation); ministry level (Brunei Darussalam: MOD, Cambodia: MIH, Indonesia: RISTEK- DIKTI, Lao PDR: MOST, Malaysia: MOSTI, Myanmar: MOE, Philippines: DOST, Thailand: MOST, and Vietnam: MOST); agencies under a ministry level (Indonesia: PAPPORTEK-LIPI, Malaysia: SBC, Singapore: A*STAR, Thailand: STI Office, Vietnam: NISTPASS); and a division/unit under an agency under a ministry level (Thailand: NECTEC).

The interviewees' comments and narratives regarding their organisational innovation and innovativeness are used as examples and illustrations to the proposed POINT factors. The organisational innovativeness of the participated public organisations were assessed and compared based on the eight factors of POINT and discussed in more details in Chapter 4.

3.2.3 Content validation of the indicators (item statements) via IOC with the experts

The proposed item statements or indicators to measure public organisational innovativeness were compiled and adapted based on the literature reviews of factors affecting organisational innovation and innovativeness and how they have been measured as discussed in Chapter 2. Some of the item statements were also developed based on the inputs from the in-depth interviews. The proposed 60 item statements based on the eight factors and 20 sub-factors of POINT are shown in Table 3.3 in section 3.2.3.2 Research instrument in this section. These item statements were sent to the selected groups of experts (n = 12) (Appendix 4) for content validation via Item-Objective-Congruence (IOC) method. After the IOC validation, one item statement was opted out and not used in the subsequent quantitative research of online survey to measure organisational innovativeness of public agencies in ASEAN.

3.2.3.1 Population and sampling

The experts for content validation of the item statements to measure OI in public organisations were selected and approached based on the two criterions of 1) the experts who have previous experience and expertise in organisational innovation management research, and 2) the potential target users of POINTinno.com web-based application that work in public organisations in ASEAN member countries. In total, 20 experts were approached and contacted via emails to participate in the IOC content validation however, 12 experts or 60% were actually replied with the IOC results. There were eight experts from Thailand and the rest were from Indonesia, Malaysia, Singapore, and Hong Kong. The list of the experts who participated in the IOC content validation is shown in Appendix 4.

3.2.3.2 Research instrument

The research instrument used for the content validation via the IOC (Item-Objective-Congruence) method is via the questionnaire survey as shown in Appendix 5. The IOC method was developed by Rovinelli & Hambleton (1977) as a procedure to evaluate content validity at the item development stage by assessments of unidimensional scale measurement comprising of multiple factors (Turner & Carlson, 2003). The results of the IOC are shown as the Indexes of the IOC, which can take the values from -1 to 1. Each expert is asked to rate the individual items based on the degree to which they measure specific objectives listed by the test developer whereby:

1 = the item statement is valid or suitable to be included in the measurement construct

0 = not sure whether the item statement is valid or not

-1 = the item statement is not valid or not suitable to be included.

The index of the IOC of each item statement is then calculated based on the following summation formula:

$$\text{Index of IOC} = \frac{\sum R}{N}$$

R is the score given to that item by each expert

N is the total number of experts rating the item

According to Janchome (2016), the item statement is valid to be included in the measurement construct if the index of IOC is at least 0.50

3.2.3.3 Data collection

The experts were approached and contacted by emails, phone, and/or social applications to participate in the IOC content validity survey. The IOC questionnaire along with the instruction on how to rate each item statement to measure public organisational innovativeness was sent to all the experts who agreed to participate in the survey that took place in December 2017 to January 2018. The IOC questionnaire is shown in Appendix 5.

3.2.3.4 Data analysis

The index of IOC was calculated for each proposed item statements. Some of the wordings were revised based on the recommendations of the experts to ensure that the item can actually be used to measure the proposed eight factor and twenty sub-factors of organisational innovativeness of public agencies in ASEAN.

3.2.4 Quantitative research to measure organisational innovativeness

3.2.4.1 Population and sampling

Population target of this research is employees at all positions of the ministries and agencies that are the main National Focal Points of the ASEAN COST and the S&T Cooperation Division at the ASEAN Secretariat. The main mandates and functions of these ministries and agencies are the development and promotion of STI. Estimations of the numbers of employees of these ministries and agencies (target population estimation) are shown in Table 3.3

Table 3.3: Estimation of the total number of employees of target national COST focal point ministries and agencies (target population)

| Country | Ministry or Agency | No. of Employees |
|-------------------|---|------------------|
| Brunei Darussalam | Ministry of Development (MOD) | 5,000 |
| Cambodia | Ministry of Industry and Handicraft (MIH) | 700 |
| Indonesia | Ministry of Research, Technology and Higher Education (RISTEK- DIKTI) | 10,000 |
| | S&T Division at the ASEAN Secretariat | 5 |
| Lao PDR | Ministry of Science and Technology (MOST) | 500 |
| Malaysia | Ministry of Science, Technology and Innovation (MOSTI) | 5,000 |
| Myanmar | Ministry of Education (MOE) | 1,500 |
| Philippines | Department of Science and Technology (DOST) | 7,000 |
| Singapore | Agency for Science, Technology and Research (A*STAR) | 5,000 |
| Thailand | Ministry of Science and Technology (MOST) | 7,000 |
| Vietnam | Ministry of Science and Technology (MOST) | 2,000 |
| Total | | 34,705 |

Purposive sampling method was used by directly contact the representatives of the target ministries and agencies to voluntary participate in the online survey. Target collected quota sampling method was used to finish collecting the online results when the total number of responses reached $n = 300$ in order to have enough data points for the CFA and cluster analyses. Dewberry (2004: p311) summarised the question of how big a sample should be enough for factor analysis that the sensible approach in most circumstances is to say that 300 cases should be the minimum, and anything more than this is a good thing. The initial total responses collected were 314, however 290 were completed responses with no missing value.

3.2.4.2 Research instrument

The POINT 59 item statements after cutting off IT25 that did not pass the IOC validity test were reviewed again by three experts and changed the wording from “This organisation...” to “My organisation...” in the next step of developing the online questionnaire to measure POINT in the target public organisations.

Three online URL survey links via SurveyMonkey.com were created in three languages of English, Thai, and Bahasa Malay as shown in Appendix 6A, 6B, and 6C respectively. To encourage more responses and interests, the introduction page of the survey explains that for every completed response received, the researcher is pledge to donate 20 Thai Baht or approximately USD0.60 to support education and learning activities of children in poor urban slums in Thailand and Malaysia.

The survey questionnaire to measure organisational innovativeness in public agencies can be separated into 6 main parts with different types of questions including multiple choices (only one answer can be selected), tick box questions (more than one answers can be selected), ranking of importance of the factors of organisational innovativeness based on a 5-point Likert scale, rating of strongly disagree to strongly agreement with the statement based on a 5-point Likert scale, and open-ended questions with the options for the participants to fill in their answers.

Since, the online survey URL links were distributed to the target respondents via various channels and to ensure that only the employees of the public organisations would answer the part to measure OI, a multiple choice screen question (Q15) with added logic to direct the respondents to the correct part of the survey were added in the questionnaire. The respondent is asked whether their organisation is a public or government agency. If the answer is Yes, they will be asked to please continue to Q16 and the rest of the survey. If the answer is No, then the respondent is not working in a public organisation, they will be asked to please skip Part 5: Rating of organisational innovativeness and continue to Q20 in Part 6: Public perception of ASEAN COST and associated groups.

3.2.4.3 Data collection

The online survey URL links were emailed to target public organisations in the ASEAN COST associated networks. The URL links were also distributed via social media channels and social applications such as Facebook and Line of the target organisations. Cover letters with the request for the organisations to participate in the survey were sent to the target public organisations in ASEAN that has the main function to promote STI. After the first two week of awaiting to receive responses, more target respondents were contacted directly via emails to kindly remind them to answer the survey. The online survey links were open for three months from February 2018 to April 2018.

3.2.4.4 Data analysis

3.2.4.4.1 Internal consistency test

The first 50 responses received were used as a pilot survey to test the internal consistency reliability of the survey questionnaire was tested via Cronbach's Alpha coefficient (α) calculations in the SPSS Software. The Cronbach's Alpha coefficients of all the eight factors of POINT comparing $n = 50$ and $n=290$ are shown in Table 3.4

Table 3.4: Internal consistency reliability test of the survey via Cronbach's alpha coefficient

| POINT factors | Cronbach's alpha coefficients | |
|---|-------------------------------|---------|
| | n = 50 | n = 290 |
| F1: Culture innovativeness | 0.924 | 0.934 |
| F2: Leadership innovativeness | 0.912 | 0.915 |
| F3: Strategy innovativeness | 0.884 | 0.896 |
| F4: Workforce innovativeness | 0.893 | 0.909 |
| F5: Resources innovativeness | 0.901 | 0.916 |
| F6: Management innovativeness | 0.919 | 0.936 |
| F7: Performance innovativeness | 0.935 | 0.955 |
| F8: Network & External context innovativeness | 0.919 | 0.937 |
| POINT | 0.981 | 0.985 |

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. There is no lower limit to the coefficient. The closer Cronbach's Alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George & Mallery (2011) provide the following rules of thumb of the Cronbach's Alpha (α) values that $\alpha \geq 0.9$ = Excellent, $\alpha \geq 0.8$ = Good, $\alpha \geq 0.7$ = Acceptable, $\alpha \geq 0.6$ = Questionable, $\alpha \geq 0.5$ = Poor, and $\alpha < 0.5$ = Unacceptable. The Cronbach's Alpha values of the first 50 responses are from 0.884 (F3: Strategy) to 0.935 (F7: Performance). The overall POINT Cronbach's Alpha value is 0.981 in the excellent range. All of the Alpha values are in the Good to Excellent range therefore, the questionnaire has high internal consistency and is suitable to be used. The Cronbach's Alpha values of n = 290 responses are from 0.896 (F3: Strategy) to 0.955 (F7: Performance). The overall POINT Cronbach's Alpha value is 0.985, which is in the excellent range.

3.2.4.4.2 Descriptive and multivariate statistical analysis

Descriptive statistical analysis of the obtained results from the online surveys were analysed using SPSS software version 22. The descriptive statistics are percentages, arithmetic means, and S.D. to compare geographical backgrounds of the respondents such as gender, age, highest education qualification, current employment position, number of employees, and the country where the organisation is located.

Multivariate statistical analysis methods of Exploratory Factor Analysis (EFA) and First order Confirmatory Factor Analysis (CFA) were used to verify how the proposed measurement model of POINT fit the observed empirical data from the survey. EFA was used to review the possible underlying factor structure and CFA is used to confirm it. EFA was run in SPSS software version 22 and CFA in MPLUS software version 7.4. SEM technique was used to capture the causal relationship of each factor in the proposed structural model of POINT.

The fit indices used are Chi-Square test, Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Root Mean Square Residual (RMSR).

The correlations among the observed variables are represented by the standardized factor loading (β), percentage of variances (R^2), and factor score coefficients (FS).

3.3 Develop POINTinno.com: online web-based application for measuring OI

The weighted sum method was used to create the underlying measurement framework and the development of POINTinno.com as a decision support online application because it is the best known and simplest method for multi-criteria decision making.

The main steps to create POINTinno.com are:

1. Develop the measurement framework model of the overall organisational innovativeness index or POINT Index Score in the programme by determining the percentage weight of each factor of POINT based on the empirical results of the important rating by the users. The weight of each item statement is obtained by converting the CFA factor scores into weighted sum percentage.
2. Determine the groupings and cutting ranges of POINT scores in the program using the results of the K-Means Cluster analysis of the average overall ASEAN POINT scores and each factor scores as observed from the results of the ten ASEAN member countries. The overall POINT scores are normalised to 100 as it is the most widely used and accepted as standardized Index scoring. The weight of each factor in the groupings is adjusted according to the results of the factor important rating. The different levels of average weight adjusted ASEAN POINT Index Scores can be used as the cutting points to separate the users into different levels of organisational innovativeness. The average weight adjusted POINT score of each AMS can be used as the national average POINT score base in the software program accordingly.
3. Determine the overall features of POINTinno.com online web-based application both in the front-end user interfaces and back-end root user requirements and data management.

The steps involved in the development of POINTinno.com follow the 7-step system development life cycle (SDLC) of online web-based application that include planning, analysis, design, development, testing, implementation, and maintenance.

POINTinno.com online software program is developed based on MySQL database server, Apache+PHP application server, and Linux OS operating system. Each server-client connection must be communicated over Transport Layer Security (TLS) protocol.

The development and pre-testing of POINTinno.com was carried out in conjunction with 3 professionals in online web-based application developer, webpage designer and programmer. The design and user pre-testing of POINTinno.com was done by discussing the desirable features and user expectations with 3 potential users working at STI Office and NECTEC in Thailand.

3.4 User acceptance test of POINTinno.com and its commercialisation potential

User acceptance test of POINTinno.com was conducted in order to apply the results to determine the commercialisation potential of POINTinno.com as an online web-based application to support strategic decision making and policy planning of public organisations. The obtained results and analysis completed the research objective no. 4 in this study.

3.4.1 Population and sample

The potential target public organisations in ASEAN in the ASEAN COST networks were contacted and inquired whether they would be interested in testing POINTinno.com to measure and compare their organisational innovativeness with other public organisations in ASEAN. The replied organisations were from Thailand (STI Office and NSTDA), Malaysia (SBC), and Philippines (DOST). The total number of potential users that tested POINTinno.com application and completed the user

acceptance survey was n=25 respondents (14 from STI Office, 3 from NSTDA, 5 from SBC, and 3 from DOST).

3.4.2 Instrumental design

The questionnaire instrument for user acceptance testing was developed based on the factors of Technology Acceptance Model (TAM) (David & Vankatesh, 1996) that have been widely used by practitioners to predict user acceptance and usage of new ICT applications. The five-point Likert scale items were developed to test the three TAM factors of 1) perceived usefulness, 2) perceived ease of use, and 3) behavioural intention to use.

In order to determine how users would prefer to access POINTinno.com application, there was a question asking the users about their preferences regarding how they would prefer to use POINTinno.com application via non-membership access (per usage pay) or membership unlimited access plus free consultation on how to apply the results of POINT Index Scores and utilise the application's analysis and recommendations to improve their organisational innovativeness. In addition, the users were also asked how much they were willing to pay to use POINTinno.com so that the average prices obtained from this survey can be used in the financial feasibility in the commercialisation assessment. The questionnaire to test user acceptance of POINTinno.com is shown in Appendix 7.

3.4.3 Data collection

An online survey was created at www.SurveyMonkey.com to test the user acceptance of POINTinno.com application as shown in Appendix 7. Online survey was used because the potential users were based in different organisations in different countries. The survey participation was maximised via the use of online survey since the online survey URL access link could be directly emailed to the target survey respondents.

The researcher contacted the CEO of Sarawak Biodiversity Centre (SBC) via email correspondents and went to SBC in Malaysia on 16 May 2018 to demonstrate to the potential users for one hour on how to access and use POINTinno.com to measure and compare their organisational innovativeness level to other organisations in ASEAN. The participants were then asked to complete the online user acceptance survey after the demonstration session ended.

The potential users who had agreed to participate in the user acceptance survey in Thailand and Philippines were contacted via email correspondents with the explanations and the PowerPoint presentation file of the instruction on how to access and use the application at www.pointinno.com as well as the online URL link of the user acceptance survey after they have finished using the application.

3.4.4 Data analysis

The results obtained from the online user acceptance survey after the potential users used POINTinno.com application were collected and analysed via basic statistics in Microsoft Excel to determine the average mean scores of the TAM factors of 1) perceived usefulness, 2) perceived ease of use, and 3) behavioural intention to use.

The commercialisation potential of POINTinno.com is assessed based on the concept of project feasibility study that can help identify a suitable business plan and investment strategy to make a business work. The feasibility factors to consider are: market feasibility, technical feasibility, operational feasibility, and financial feasibility. The results and analysis of POINTinno.com user acceptance survey and the commercialisation potential are discussed in Chapter 7.

CHAPTER 4

QUALITATIVE RESULTS

In this chapter, the organisational structures of the public organisation in ASEAN that were participated in the semi-structure interviews are discussed along some examples of the narratives based on the eight factors of organisational innovativeness in POINT. The level of organisational innovativeness based on the proposed 20 sub-factors in POINT is then assessed and compared across these public organisations.

4.1 Organisational structures of the public organisations in ASEAN in this study

The descriptions and organisational structures of the selected public organisations in ASEAN in this study are described. The organisational levels in this study can be regional intergovernmental (ASEAN Secretariat) or at the ministry level, agencies under a ministry level, or a division/unit under an agency under a ministry level. These organisational levels are also consequently reflected in the quantitative survey questionnaire in the quantitative research. The selected public organisations in ASEAN in this research represent the main organisations that are responsible for the development and promotion of STI in ASEAN both at the government policy formation and policy implementation and are summarised in Table 4.1.

**Table 4.1: Organisational levels and functions
of the selected ASEAN public agencies in this research**

| Country | Organisation level | Public agency | Function |
|------------------------------------|--------------------------------|---|---|
| International network organisation | Multi-level | ASEAN Committee on Science and Technology (COST) | Promote STI in ASEAN |
| Indonesia | Regional inter-government | ASEAN Secretariat Science and Technology Cooperation Division | Coordinator and secretariat of ASEAN COST |
| Brunei Darussalam | Ministry | Ministry of Development (MOD) | COST focal point up to 2016 |
| Cambodia | Ministry | Ministry of Industry and Handicraft (MIH) | COST focal point Promote STI |
| Indonesia | Ministry | Ministry of Research, Technology and Higher Education (RISTEK-DIKTI) | COST focal point Promote STI |
| Lao PDR | Ministry | Ministry of Science and Technology (MOST) | COST focal point Promote STI |
| Malaysia | Ministry | Ministry of Science, Technology and Innovation (MOSTI) | COST focal point Promote STI |
| | Agency under a ministry | Sarawak Biodiversity Centre (SBC) | Promote STI |
| Myanmar | Ministry | Ministry of Education (MOE) | COST focal point Promote STI |
| Philippines | Ministry | Department of Science and Technology (DOST) | COST focal point Promote STI |
| Singapore | Agency under a ministry | Agency for Science, Technology and Research (A*STAR) | COST focal point Promote STI |
| Thailand | Ministry | Ministry of Science and Technology (MOST) | COST focal point Promote STI |
| | Agency under a ministry | National Science Technology and Innovation Policy Office (STI Office) | Promote STI |
| | Division/ unit under an agency | National Electronics and Computer | Promote STI |

| Country | Organisation level | Public agency | Function |
|---------|-------------------------|--|---------------------------------|
| | under a ministry level | Technology Center (NECTEC) | |
| Vietnam | Ministry | Ministry of Science and Technology (MOST) | COST focal point Promote STI |
| | Agency under a ministry | National Institute for Science and Technology Policy and Strategy Studies (NISTPASS) | Promote STI |

4.1.1 The ASEAN Committee on Science and Technology (COST)

COST is the main supranational intergovernmental committee under the ASEAN Ministerial Meeting on Science and Technology (AMMST), which is one of the highest ASEAN official diplomatic divisions under the AEC pillar. COST was set up in 1978 following the rebranding of the ASEAN Permanent Committee on Science and Technology (PCOST). During the 4th AMMST, the ministers adopted the first APAST as the guiding framework for S&T cooperation and established the ASEAN Trust Fund for S&T, which later on will be known as the ASEAN Science Fund (ASF).

The initial contribution of the ASF came from member countries at that time (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand). Later on following the joining of Vietnam in 1995, Lao PDR and Myanmar in 1997, and Cambodia in 1999 to make up the current ten member countries of ASEAN, each member country signed the agreement to contribute USD1.0 million to the ASF in annual payments over a period of 10 years. Currently, the ASF has the total budget of slightly over USD11.0 million to fund the projects as agreed by COST and AMMST.

However, so far only the interest earned via low risk saving account is agreed to be conservatively spent but not the principal sum of the ASF. Recognised this limitation, in 2014 AMMST endorsed the amendment of the ASF Guidelines and rebranded the ASF to the ASEAN Science Technology and Innovation Fund (ASTIF) and allowed for the principal fund to be used in innovation related activities such as high-risk R&D projects and call for the top-up of the ASTIF if necessary. Nevertheless,

COST representatives especially from lower income countries still remain reluctant and unable to agree upon any projects that require the principal fund of the ASTIF.

COST usually holds two meetings per annual similar to the ASEAN Submit. COST meetings usually last approximately one week long with a number of back to back meetings of its nine sub-committees, Advisory Body of the ASEAN Plan of Action on Science and Technology (ABAPAST), Advisory Body of the ASEAN Science Fund (ABASF), and dialogue partner meetings. The results and agreements of each meeting are recorded in the formal reports by the ASEC representatives. The outcome of agreements and decisions are reported up the chain of command from the subcommittees to the ABAPST or ABASF, COST and AMMST.

The decision making processes in COST underline the intergovernmental nature with two parallel tracks of both formal and informal interaction options (Rodriguez & Soeparwata, 2012a; Morrison, 2004). The first formal option refers to the official government diplomatic track in which the appointed representatives from their respective AMS reflect the official stance of their governments and the other track is the informal interactions among COST members and associated groups to share ideas without making official statements or binding commitments.

The administration, conduct, and operation of COST as well as the ASEC as the central coordinator and record keeper of all the meetings and projects among the AMS, dialogue partners, and other stakeholders are of formal and bureaucratic organisation framework that emphasises the impersonal ostensibly rational with clearly defined authorities, chain of command, and responsibilities among actors, formal record keeping, and uniform application of standard rules and procedures. This type of organisational bureaucracy in which decision-making processes are centralized, work processes are formalized (i.e. standardised), and division is particularly specialised, promote efficiency but do not encourage innovation (O'Reilly & Tushman, 2013).

Following the restructuring of COST in 2016, the TOR and responsibilities of ABAPAST and ABASF are combined to form Board of Advisors to COST (BAC) that oversees the APASTI implementation and funding. The current organisational structure of COST is shown in Figure 4.1.

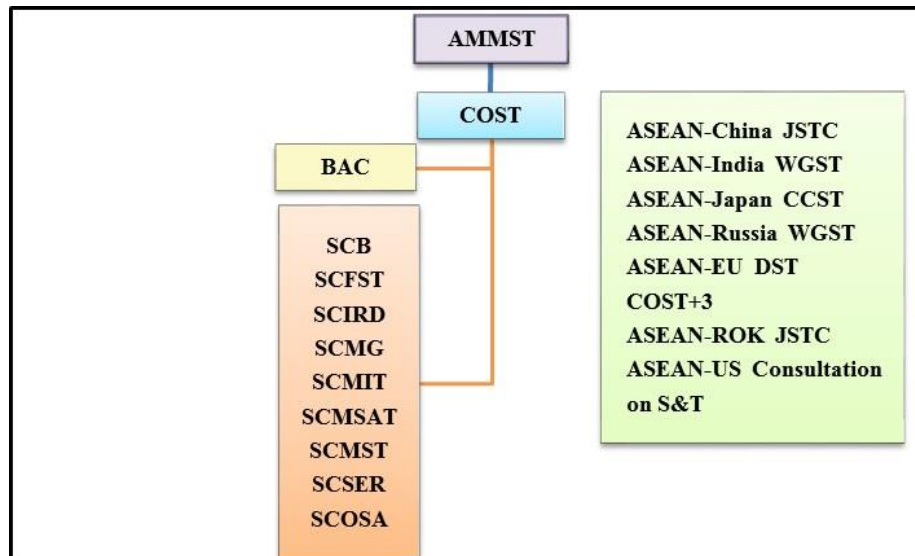


Figure 4.1: The current structure, subsidiaries, and associated dialogue partners of COST

SCB = Subcommittee on Biotechnology, SCFST = Sub-Committee on Food Science and Technology, SCIRD = Sub-Committee on Infrastructure and Resources Development, SCMG = Sub-Committee on Meteorology and Geophysics, SCMIT = Sub-Committee on Microelectronics and Information Technology, SCMSAT = Sub-Committee on Marine Science and Technology, SCMST = Sub-Committee on Material Science and Technology, SCSER = Sub-Committee on Sustainable Energy Research, SCOSA = Sub-Committee on Space Technology and Application; EGM = Expert Group on Metrology (under SCIRD); JSTC = Joint Science and Technology Committee, CCST = Cooperation Committee on Science and Technology, WGST = Working Group on Science and Technology, DST = Dialogue on Science and Technology.

AMMST members are ministers or top political diplomats from all the ten AMS, whereas National COST Chair is a permanent secretary or top civil servant position within a ministry. COST Chair is selected among the ten National COST Chair to lead COST meeting, normally hold the position for one year, and hand over the position to the next COST Chair rotating alphabetically from Brunei Darussalam to

Vietnam. The hosting of COST and associated meetings or workshops are organised by the appointed ministry of each AMS and all the ten AMS take turn to host the events.

New concepts, project proposals, or initiations from all the AMS or dialogue partners that seek collaboration with COST have to contact the S&T Division at the ASEC to consult and decide as to which of the nine sub-committees or associated groups they should seek to present the ideas for further cooperation and endorsement. The nine sub-committees are groups of appointed experts, university professors, and researchers from the ten AMS in the areas of biotechnology, food science and technology, infrastructure and resources development, meteorology and geophysics, microelectronics and information technology, marine science and technology, material science and technology, sustainable energy research, and space technology and application.

The nine sub-committees select and rotate the Head of the Sub-Committees position among themselves and normally meet to discuss the on-going projects during the annual COST meetings. Some of the sub-committees have established task force, working and experts groups to work on specific areas of concern such as the Expert Group on Metrology (EGM) under the purview of SCIRD. Cooperation with ASEAN dialogue partners has also been formalised through the establishment of joint committees, working groups and related platforms. The dialogues partners with on-going cooperation in COST are China, Japan, South Korea, COST+3, EU, Russia, India, and USA.

There are approximately 131 completed projects completed by COST and subsidiaries from 2007-2016 (ASEAN Secretariat, 2016) and most of these projects are initiated in collaboration with the dialogue partners for training, capacity building, resources sharing, networking, technical visits, and best practice exchanges. An empirical assessment of the STI performance of COST member countries from 1999 – 2009 by Rodriguez & Soeparwata (2012b) based on a composite indicator the Summary Science, Technology and Innovation Index (SSTII) from Hollanders & Tarantola (2011) concluded that the overall STI performance was distributed in a skewed fashion across the ten AMS. Singapore was described as a leader with highest STI performance, Malaysia as a follower, and many trailing countries and with progress in terms of

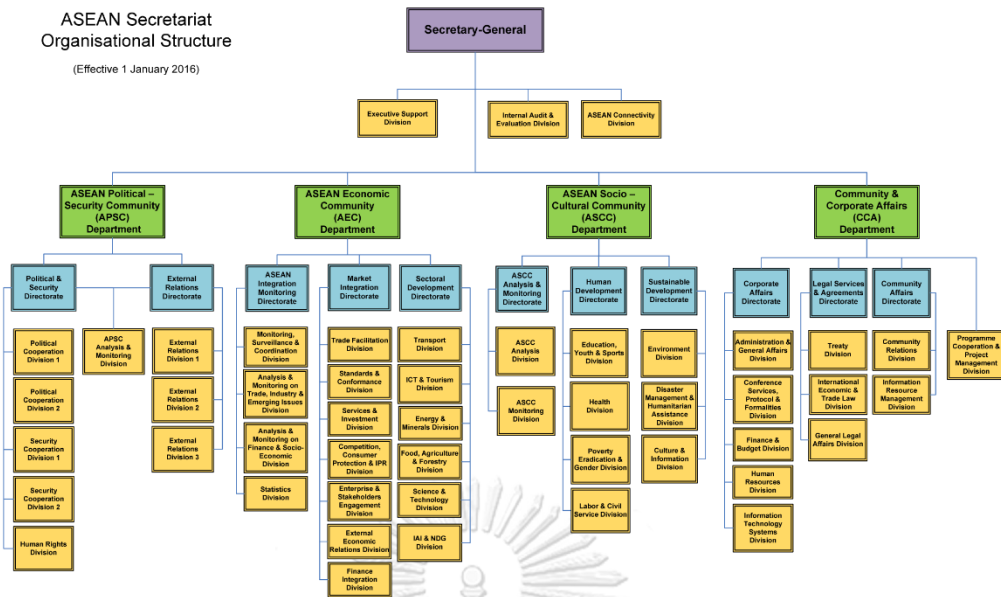
growth. Brunei Darussalam, Cambodia, Lao PDR, Myanmar, and Vietnam were trailing in their STI performance, while Indonesia, the Philippines, and Thailand were catching up.

The performance of COST and its subsidiaries depends, to a large extent, on the leadership of the Chairs of the Sub-Committees, Chair of BAC, as well as on the amount of support from the AMS and the ASEC. However, the Chair's role has mostly been limited to presiding over the meetings and the more challenging tasks of providing leadership, initiating, directing, and overseeing the implementation of the agreed plans of action for the duration of the Chair's term are not fully met. COST is an intergovernmental organisation that depends on the public funded money hence, it needs to justify and leverage the limited resources in order to effectively deliver the expected results and outcome for the ASEAN STI communities.

4.1.2 The ASEAN Secretariat (ASEC)

The ASEC was set up in February 1976 by the Foreign Ministers of ASEAN. It was then housed at the Department of Foreign Affairs of Indonesia in Jakarta. The existing ASEC at 70A Jalan Sisingamangaraja, Jakarta was established and officiated in 1981 by the then President of Indonesia, H.E. Soeharto. The ASEC's basic function is to provide for greater efficiency in the coordination of ASEAN organs and for more effective implementation of ASEAN projects and activities (source: <http://asean.org/asean/asean-secretariat/>). The ASEC's mission is to initiate, facilitate and coordinate ASEAN stakeholder collaboration in realising the purposes and principles of ASEAN as reflected in the ASEAN Charter.

The head of the ASEC is the Secretary General which normally holds the position for 5 years rotating alphabetically among all the AMS. The current ASEAN Secretary General starting in 2018 - 2022 is from Brunei Darussalam whom replaced the previous Secretary General from Vietnam.



1 of 1

Figure 4.2: ASEAN Secretariat organisational structure

(Source: <http://asean.org/storage/2012/05/ASEAN-Secretariat-Organizational-Structure-effective-1-January-2016.png> as of June 2018)

The three divisions that are directly under the Secretary General are the Executive Support Division, Internal Audit and Evaluation Division, and ASEAN Connectivity Division. There are 4 main departments divided based on the main functions of the ASEC namely 1) ASEAN Political Security Community (APSC) Department, 2) ASEAN Economic Community Department (AEC), 3) ASEAN Socio-Cultural Community (ASCC) Department, and 4) Community & Corporate Affairs (CCA) Department. Currently, the Heads of the APSC and the ASCC divisions are appointed in rotation among the ten ASEAN member countries, whereas the Heads of the AEC and CCA are from open recruitments.

Under the ASEC current organisational structure effective from 1 January 2016, the S&T Cooperation Division is under the Sectoral Development Directorate of the AEC Department at the ASEC organisational structure as shown in Figure 4.2. Previously the S&T Cooperation Division was placed under the ASCC Department.

S&T Cooperation Division at ASEC is the central management division of COST that has responsibilities to coordinate all the organisational administrative activities among its members. Formal and informal relationships and collaboration among the individuals, subsidiaries, and member organisations across different levels of national and international ties, nodes, and networks of public, private, and academic sectors within and outside COST are essential in transforming new ideas or strategic plans into successful actions, operations, and implementations.

The total number of personnel at the ASEC is around 300. Most of the positions at the ASEC are hired by contract terms lasted 3 years with possibility to renew the contracts twice and after that the contract renewals need approvals from the Secretary General.

4.1.3 Brunei Darussalam: Ministry of Development (MOD)

Science and Technology, Research and International Division under the Ministry of Development (MOD) hold the responsibility for overseeing the nation's science and technology efforts. The Division responsible in coordinating science activities locally, regionally and internationally and also support R&D by funding research projects and science and technology activities. In realizing the importance of science and technology, the National Committee on Science and Technology (NSTC) was formed in 1994 and chair by the MOD. The mission of the committee is to promote and encourage the development of science and technology in the interest of national development.

Ministry of Development (MOD) was Brunei Darussalam was the main ministry that coordinate the S&T funding activities and also the National COST Focal Point until 2016 when the role was handed over to the Prime Minister Office.

4.1.4 Cambodia: Ministry of Industry and Handicraft (MIH)

Ministry of Industry and Handicraft (MIH) main functions are to support the modernisation of Cambodia business enterprises which are mostly SMEs in the garments and food processing to become more knowledgeable and capable in order to compete in the global market. The Cambodia Industry Development Policy 2015 – 2025 provides overall policy guidance for the country's industrial development towards more sustainable economic diversification, strengthening competitiveness and improved productivity. The key challenging characteristics of Cambodia industries include lack of diversity in industrial base, weak entrepreneurship, urban-centered industry, low level of technology application. Apart from this, there are inadequate supply of important infrastructures of electricity, clean water, telecommunication network, and transportation logistics.

There are six main departments under the MIH with internal division units.

1. Department of General Affairs
 - Administrative affairs
 - Personnel
 - Accounting and finance
 - Legal affairs division
 - Planning, statistics, cooperation, and ASEAN affairs
2. Department of Industry
 - Industry affairs
 - Technique, Science and Technology
 - Potable water division
 - Accreditation
 - National of productivity centre
3. Department of SMEs and Handicrafts
 - SMEs division
 - Handicraft affairs division
 - SMEs planning and development promotion

4. Institute of Standards
 - Information division
 - Standard development, training, and consulting
 - Standard certification
 - Standard regulatory
 - Cambodia Industry Laboratory Centre
5. National Methodology Center
 - Metrology laboratory
 - Legal metrology
 - Metrology legal affairs
 - Industry metrology
6. Inspection Department
 - Internal audit
 - Financial controller unit

4.1.5 Indonesia: Ministry of Research, Technology and Higher Education (RISTEK- DIKTI)

Indonesia Ministry of Research, Technology and Higher Education (RISTEK-DIKTI) was established in 2015 by merging former ministry and sub-ministry organisation or directorate general: Ministry of Research and Technology and Directorate General of Higher Education. Previously the Directorate General of Higher Education was governed by the Ministry of Education and Culture. One of the main reasons for the merging was to emphasize STI promotion and R&D in Indonesia higher education sector.

The main mandates of RISTEK-DIKTI are to:

- Increase the number of educated and skilled work force having higher education
- Enhance the quality for higher education provider and R&D institution

- Increase the number of qualified resource within R&D and higher education
- Improve productivity of research and development; and
- Advance nations capability in innovation.

Currently, there are eight main divisions in RISTEK-DIKTI

1. Minister Office of Research, Technology and Higher Education
2. Secretary of State Ministry of Research and Technology
3. Institutional Deputy Science and Technology
4. Deputy Head of Resources Science and Technology
5. Deputy Science and Technology Network
6. Deputy Relevance and Productivity Science and Technology
7. Deputy of Administrative Science and Technology
8. Director General of Higher Education

RISTEK-DIKTI also governs the following non-ministry or independent agencies based on Presidential Decree No. 4 (2003) on the co-ordination of formulation, Strategic Policy Development and Implementation of National S&T:

- Indonesian Institute of Sciences (LIPI)
- National Institute of Aeronautics and Space (LAPAN)
- Agency for the Assessment and Application of Technology (BPPT)
- National Nuclear Energy Agency (BATAN)
- Nuclear Energy Agency (BAPETEN)
- Coordination Agency for Surveys and Mapping (BAKOSURTANAL)
- National Standardization Agency (BSN)
- Research Center for Science and Technology (PUSPIPTEK) Serpong
- Eijkman Institute for Molecular Biology or Eijkman (LBME)
- Science and Technology Demonstration Center (PUSPA Science and Technology)

- Agro Techno Park (ATP) Palembang
- Business Technology Center (BTC)
- Bio Island
- Agri business

4.1.6 Lao PDR: Ministry of Science and Technology (MOST)

The Ministry of Science and Technology (MOST) is one of the actors within the S&T governance structure in Lao PDR. The organisation structure of MOST, Lao PDR is shown in Figure 4.3. MOST has four deputy ministers that are in charge of the following main departments:

Planning and Cooperation Department
 Standardization and Metrology Department
 Research National Council
 Science Department
 Technology and Innovation Department
 Department of Science, technology and innovation,
 Intellectual Property Department
 Information Technology Department
 HR Department
 Inspection Department

There are three independent institutes under MOST governance namely 1) Institute of Ecology and Biological Technology, 2) Institute of Renewable Energy and New Materials and, 3) Institute of Computer Science and Electronics.

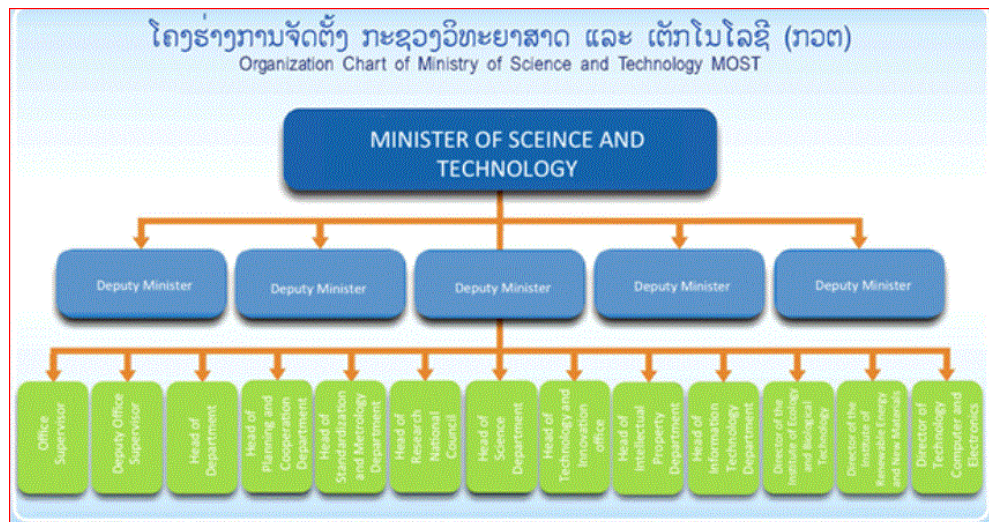


Figure 4.3: MOST, Lao PDR organisation structure

(Source: <https://sea-eu.net/facts/sea/laos> as of June 2018)

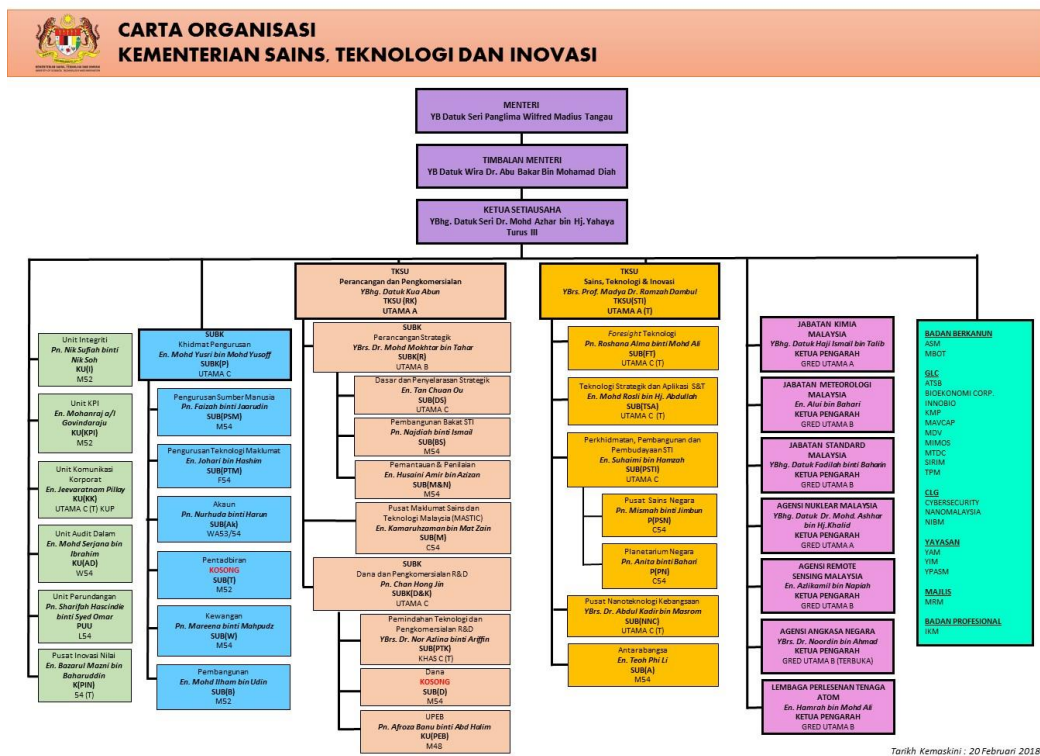
MOST also hosts two regional offices and 18 S&T bureaus at the provincial level. Overall, the ministry has more than 500 members. The main mission of the ministry is to apply scientific knowledge in order to reduce poverty and to overcome the status of “least developed country” by 2020. In order to implement this mission, five goals have been identified:

- Improvement of organisational structure
- Development of S&T legal system
- Establish sustainable innovation infrastructure
- Development of S&T human resources
- Standardization of local and provincial functions

4.1.7 Malaysia: Ministry of Science, Technology and Innovation (MOSTI)

The Ministry of Science, Technology and Innovation (MOSTI) of Malaysia was founded in 1973 and was first named Ministry of Technology, Research and Local Government. However, in order to reflect the government's emphasis on science and

technology (S&T), the Ministry was revamped and renamed in 1976 as the Ministry of Science, Technology and Environment. In 2004, the Ministry was renamed again to MOSTI. The vision of MOSTI is to lead the National (STI) Agenda. MOSTI missions are to explore, develop and utilise STI to generate knowledge, create wealth and ensure societal wellbeing towards achieving a competitive, sustainable and inclusive high income economy.



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Figure 4.4: organisation structure of MOSTI, Malaysia

(Source: www.mosti.gov.my as of June 2018)

The organisation structure of MOSTI is shown in Figure 4.4. Looking at the organizational structure of MOSTI, there are one Deputy Minister and one Secretary General that are assigned under the Minister. There are two Deputy Secretary namely: 1) Deputy Secretary General Office (Planning and Commercialisation), and 2) Deputy Secretary General Office (STI).

Minister of STI's Office

Deputy Minister's Office

Unit 1: Secretary-General Integrity Unit

- Key Performance Indicator Unit
- Corporate Communication Unit
- Internal Audit Unit
- Legal Unit

Unit 2: Deputy Secretary-General (Planning and Commercialisation)

Unit 2.1 Senior Under Secretary (Strategic Planning)

- Policy and Strategic Coordination Division
- STI Talent Development Division
- Monitoring and Evaluation Division

Unit 2.2 Malaysian Science and Technology Information Centre (MASTIC)

Unit 2.3: Senior Under-Secretary (Fund, R&D, Commercialisation)

- Technology Transfer and R&D Commercialisation Division
- Fund Division
- Bumiputera Economic Empowerment Unit

Unit 3: Deputy Secretary-General (STI)

- Technology Foresight Division
- Strategic Technology and S&T Application Division
- STI Development, Services and Acculturation Division
- National Science Centre
- Planetarium Negara
- National Nanotechnology Centre
- International Division

Unit 4: Senior Under-Secretary (Management)

- Human Resource Management Division

- Information Technology Management Division
- Account Division
- Administration Division
- Finance Division
- Development Division

MOSTI controls and supervises a number of institutions that are responsible in providing technical services to the government and the public. There are also a number of federal or state departments and federal agencies that are associated with MOSTI.

Besides divisions and agencies of the federal government, MOSTI supervises companies set up by the government or through incorporation of a government body. These are called government-linked companies such as MIMOS Bhd. (MIMOS), Multimedia Development Corporation (MDeC), SIRIM Bhd (SIRIM), Technology Park Malaysia Corporation Sdn. Bhd. (TPM), Malaysia Biotechnology Corporation (MBC), Astronautic Technology Sdn. Bhd. (ATSB), National ICT Security and Emergency Response Centre (NISER), Malaysia Network Information Centre (MYNIC), and Malaysian Technology Development Corporation (MTDC).

4.1.8 Malaysia: Sarawak Biodiversity Centre (SBC)

Sarawak Biodiversity Centre (SBC) was founded in 1997 by the Sarawak State Government to initiate programmes for the conservation, utilization, protection and sustainable development of biodiversity in the Sarawak state. The State Government also enacted the Sarawak Biodiversity Regulations in 1998. Back then, the Centre's role was primarily inventory and regulatory – often known as the gatekeeper to Sarawak's rich biodiversity to those who wanted access to and collection of biological resources in the State for research or commercial purposes.

In December 2003, the State Legislative Assembly passed the Sarawak Biodiversity Centre (Amendment) Ordinance 2003 and reviewed and passed the

revision of the Sarawak Biodiversity Regulations in 2004. The amendment relieved the Centre of its role of conducting general biodiversity inventory and regulating general biodiversity research. The Centre is now entrusted to initiate intensive biotech based research and development on the State's biological resources – particularly those that have been utilized by indigenous communities and to facilitate the documentation of the fast disappearing traditional knowledge of indigenous communities on the utilization of biological resources.

SBC vision is to enrich lives with breakthrough innovation in biodiversity. The structure of SBC organisation is shown in Figure 4.5. The CEO is the secretary of the SBC Council. The Council consists of appointed members from Ministry of Education, Science and Technological Research, Ministry of Urban Development and Natural Resources, Department of Forest, and Department of Agriculture. SBC is under Sarawak State Ministry of Resource Planning and Environment.

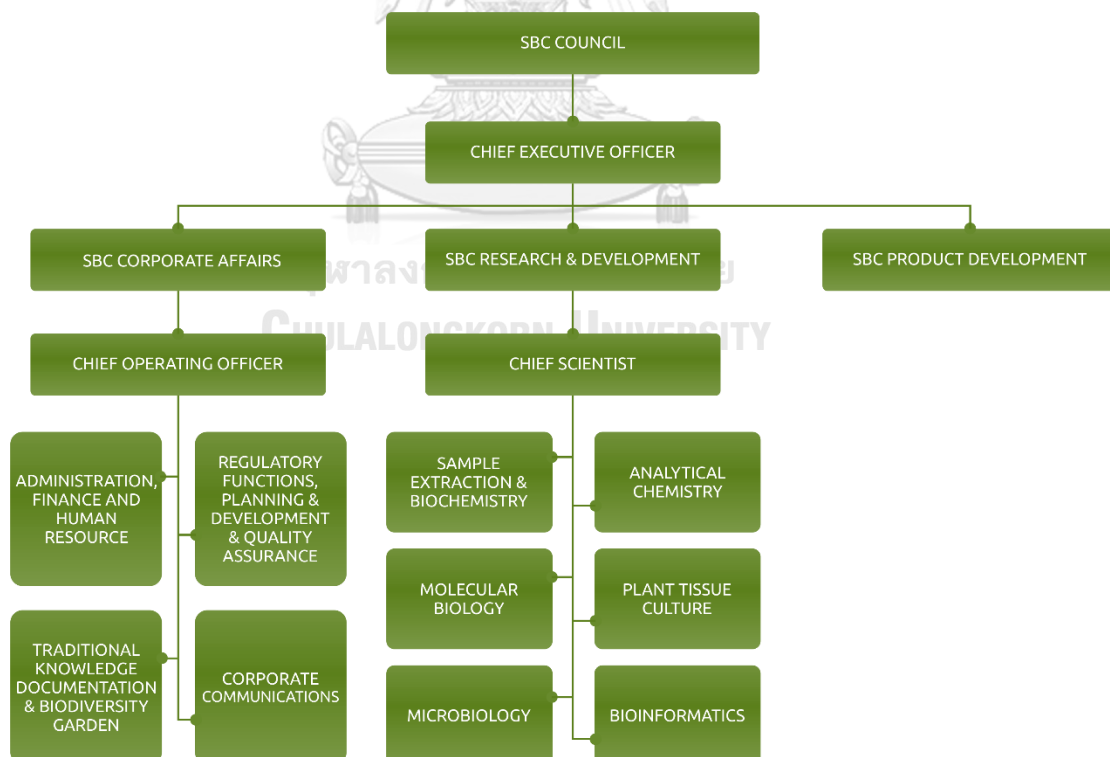


Figure 4.5: Sarawak Biodiversity Centre (SBC) organisation chart

(Source: <http://www.sbc.org.my/> as of June 2018)

There are three main divisions under the CEO namely Corporate Affairs (led by Chief Operating Officer), Research and Development (led by Chief Scientist), and Product Development.

4.1.9 Myanmar: Ministry of Education (MOE)

The Ministry of Education (MOE) is the main provider of education in Myanmar with the vision to create an education system that will generate a learning society capable of facing the challenges of the knowledge economy. MOE is implementing short- and long-term education development plans to upgrade the education standard and to develop a lifelong learning society.

There are two main sub-sectors in the education sector: the basic education sub-sector and the higher education sub-sector.

Higher Education Sub-Sector

There are 163 higher education institutions in Myanmar. Among them, 66 institutions are under the jurisdiction of the Ministry of Education while 97 institutions are under 12 other ministries. All the higher education institutions are state-financed and they specialize in varied fields such as arts and science, law, economics and business education, teacher education, foreign languages, engineering, computer studies, maritime studies, defense, agriculture, forestry, medicine, nursing, veterinary science and culture and fine arts, etc. and offer a variety of programmes – undergraduate, postgraduate diploma, master's degree programmes and doctorate programmes.

Higher education institutions under the MOE have established Centres for Human Resource Development that offer re-education and retraining HR development programmes ranging from short-term certificate programmes to master's degree programmes.

There are two Departments of Higher Education: one for lower Myanmar and one for upper Myanmar. These two departments are responsible for administration

and co-ordination of higher education institutions under the MOE. Although higher education institutions function under the administration of different ministries, academic and administrative policy matters relating to higher education are managed by the two councils chaired by the MOE: Universities' Central Council, and Council of University Academic Bodies.

The Universities' Central Council is principally responsible for broad policy and co-ordination of the work of higher education institutions, while the responsibility of the Council of University Academic Bodies lies in the adoption of academic regulations and co-ordination of academic work.

After the general election in 2016, MOST was merged with MOE based on the decision of the Myanmar government.

4.1.10 Philippines: Department of Science and Technology (DOST)

DOST is headed by a Secretary who is appointed by the President to exercise authority and responsibility for the mandate, and for supervision and control of the Department. The Secretary is assisted by 4 Undersecretaries for: 1) Disaster Risk Reduction and Climate Change 2) Regional Operations, 3) Research and Development, and 5) Science and Technical Services. The Undersecretaries also have supervision over the Institutes under their respective areas of responsibility. The Secretary is also assisted by three Assistant Secretaries for Administration, Finance and Legal Affairs, and International Cooperation.

DOST has 4 Staff Services, namely: 1) Administrative and Legal Service which provides the Department with services relating to personnel, records, property procurement and management, collection, disbursement, archiving, general services, and legal matters; 2) Financial and Management Service which provides advice and assistance on budgetary, financial and management improvement matters; 3) Internal Audit Service which assists the management in achieving efficient and effective fiscal administration and performance of its affairs and functions; and 4) Planning and Evaluation Service which provides services relating to policy development and

planning, program coordination and monitoring, and S&T resource assessment and evaluation matters.

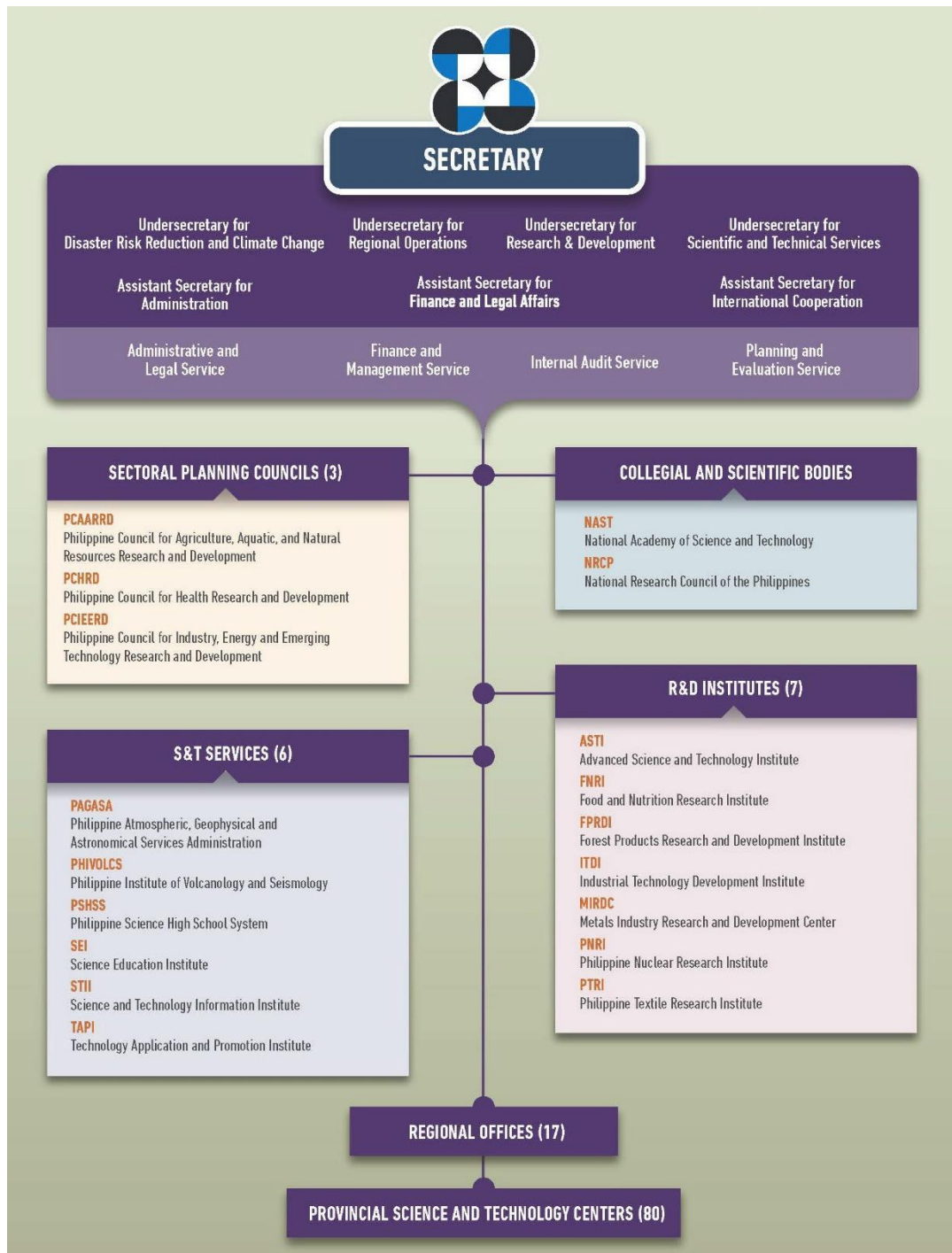


Figure 4.6: DOST Philippines organisation chart

(Source: <http://dost.gov.ph/index.php/transparency/about-dost/organizational-structure> as of June 2018)

DOST is composed of the following councils and agencies:

- Three (3) sectoral planning councils responsible for: formulating policies, plans, programs, projects and strategies for S&T development; for programming and allocating funds; for monitoring of research and development projects; and for generating external funds.
- Seven (7) research and development institutes concerned with basic and applied researches on various fields.
- Six (6) S&T service institutes rendering science and technology-related services.
- Two (2) collegial bodies with mandated functions of assistance, recognition, advisory and establishment of international linkages.
- Seventeen (17) Regional Offices headed by a Regional Director and eighty (80) Provincial S&T Centers (PSTCs) manned by PSTC Officers. The Regional Directors are under the supervision of the Undersecretary for Regional Operations. DOST Regional Offices serve as focal points for the planning and implementation of S&T programs and projects in their respective regions in consonance with the national S&T Plan. They provide S&T services to the local communities and coordinate with other government agencies and other stakeholders on S&T matters.

4.1.11 Singapore: Agency for Science, Technology and Research (A*STAR)

In 1967, the Science Council was set up in order to raise the level of S&T in Singapore. In the following year, 1968, the Ministry of Science and Technology was established with the primary mission to increase highly skilled human resources that sustain advanced industrial technology and to integrate science and technology research capabilities. After the functions of the Ministry of Science and Technology were incorporated into the Science Council, the Ministry of Science and Technology was dissolved in 1981, the National Science and Technology Board (NSTB) was established

in 1991 under the Ministry of Trade and Industry (MTI) to promote the integration of business and R&D for further development of Singapore's industry that creates high-added value. In 2002, by integrating the national research institutes of Singapore into one organization to avoid duplication of research, NSTB was dissolved and reorganized into Agency for Science, Technology and Research (A*STAR) with the goal of promoting joint work by each respective research institute. The organisation chart of A*STAR is shown in Figure 4.7

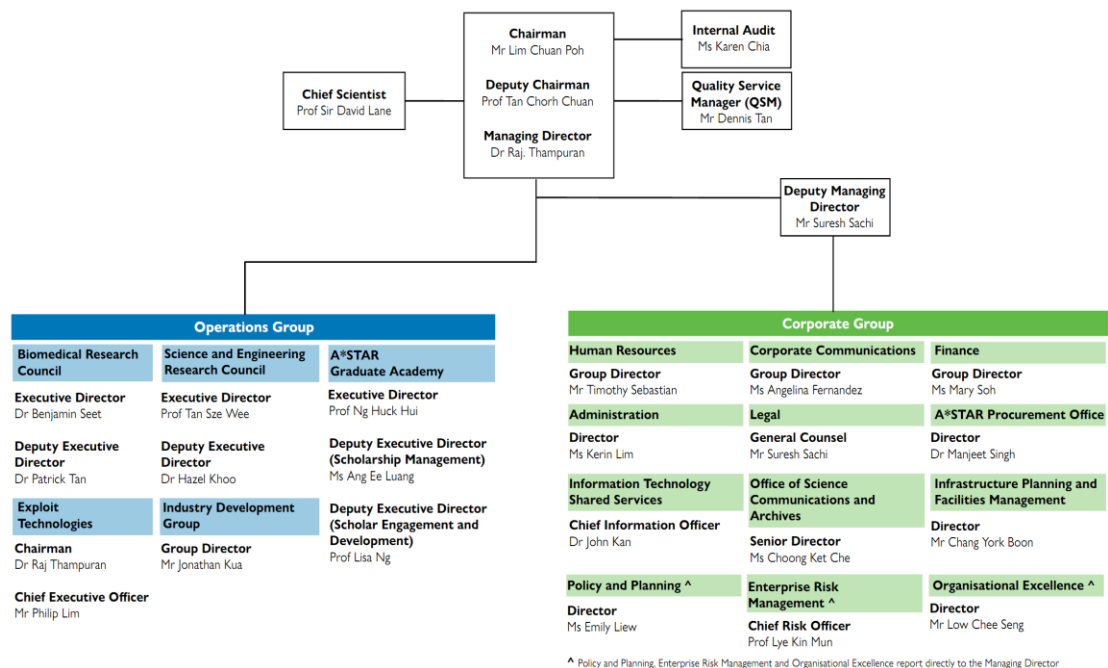


Figure 4.7: A*STAR organisation chart
(Source: A*STAR Annual Report 2017)

Vision of A*STAR is to be a global leader in science, technology and open innovation with the mission to advance science and develop innovative technology to further economic growth and improve lives.

A*STAR oversees 18 biomedical sciences, physical sciences and engineering research institutes and consortia. Exploit Technologies Pte Ltd. (ETPL) is the technology transfer arm of A*STAR that is a one-stop resource in the IP management, licensing and entrepreneurship. Together with the other public sector entities, A*STAR develops industry sectors by integrating capabilities to create impact

with multi-national corporations and globally competitive companies; partnering local enterprises for productivity and gearing them for growth; and nurturing R&D-driven start-ups by seeding for surprises and shaping for success.

4.1.12 Thailand: Ministry of Science and Technology (MOST)

The Ministry of Science and Technology (MOST) Thailand is presently tasked with forwarding the policy and strategic plan for STI and seeing to its effective and substantive implementation, both in terms of R&D as well as in terms of creating cooperative mechanisms between all sectors of society, to promoting economic benefits and enhancing quality of life.

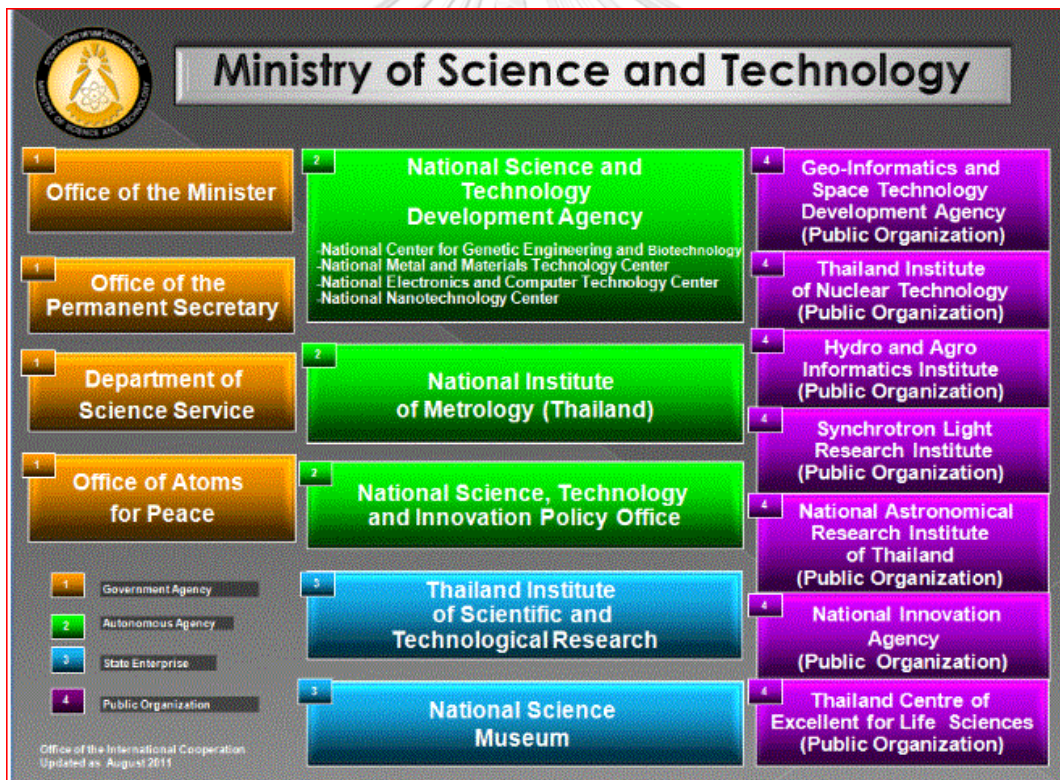


Figure 4.8: MOST Thailand Organisation Chart

(source: <http://www.most.go.th/main/en> as of June 2018)

Under the vision of excelling as the steward or main organisation in the development of science, technology and innovation, MOST aims to create and enrich the intellect of Thai society, in a manner that will support economic and social development and sustainable competitiveness. There are 16 important supporting agencies under MOST that include civil government agencies, autonomous agencies, state enterprises, and public organisations. The organisation chart of MOST Thailand is shown in Figure 4.8

4.1.13 Thailand: National Electronics and Computer Technology Center (NECTEC)

National Electronics and Computer Technology Center (NECTEC) was established on in September 1986 under the Ministry of Science, Technology and Energy (the former name of Ministry of Science and Technology). In December 1991, following the enactment of the Science and Technology Development Act of 1991, NECTEC was transformed into a national technology center under the National Science and Technology Development Agency (NSTDA), MOST. At present, NECTEC is a statutory government organisation with its main responsibilities of under taking, supporting and promoting the R&D of electronics and computer technologies. NECTEC also provides linkage between research communities and industries through the established industrial clusters and programmes.

NECTEC vision is being a research organisation collaborating with alliances for achieving practical works excellence that contributes to the economic and social impacts of the country and region. The missions are to promote research, development, design and engineering; technology transfer to industries and communities; human resource development; and policy research and industrial intelligence and knowledge infrastructure. The organisation chart of NECTEC is shown in Figure 4.9

NECTEC
Organization Chart

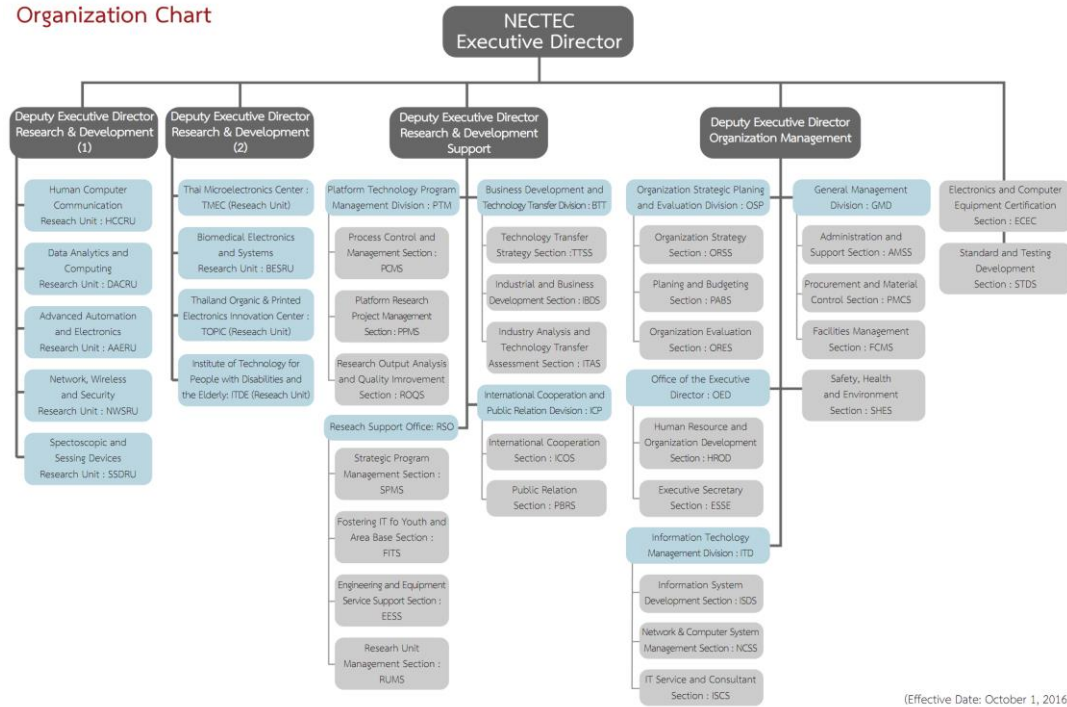


Figure 4.9: Organisation chart of NECTEC

(source: <https://www.nectec.or.th/en/> as of June 2018)

There are four Deputy Executive Directors under NECTEC Executive Director overseeing two main groups of R&D Divisions, R&D Support, and Organisation Management.

4.1.14 Thailand: National Science Technology and Innovation Policy Office (STI Office)

National Science Technology and Innovation Policy Office (STI Office) was established in 2008 as an autonomous public agency to implement the policy set forth by the National Council of Research and Innovation Policy which is chaired by the Prime Minister.

The mission of the STI Office is to formulate strategic policies and frameworks for STI and carry out the policy deployment by working with stakeholders (government agencies, academic and research institutes and industry) in order to

achieve the goals set forth in the policy framework. The Office also facilitates academic, research and development collaboration among government agencies, academic institutes, research organizations and industry within and outside Thailand in order to enhance human resource development, technology management and transfer, and innovation capability of the nation. Thailand Advanced Institute of Science and Technology (THAIST) was founded under the STI Office to specifically carry out the human resource capacity building in coordination with academic and research institutes in Thailand and from overseas. The organisation chart of STI Office shown in Figure 4.9

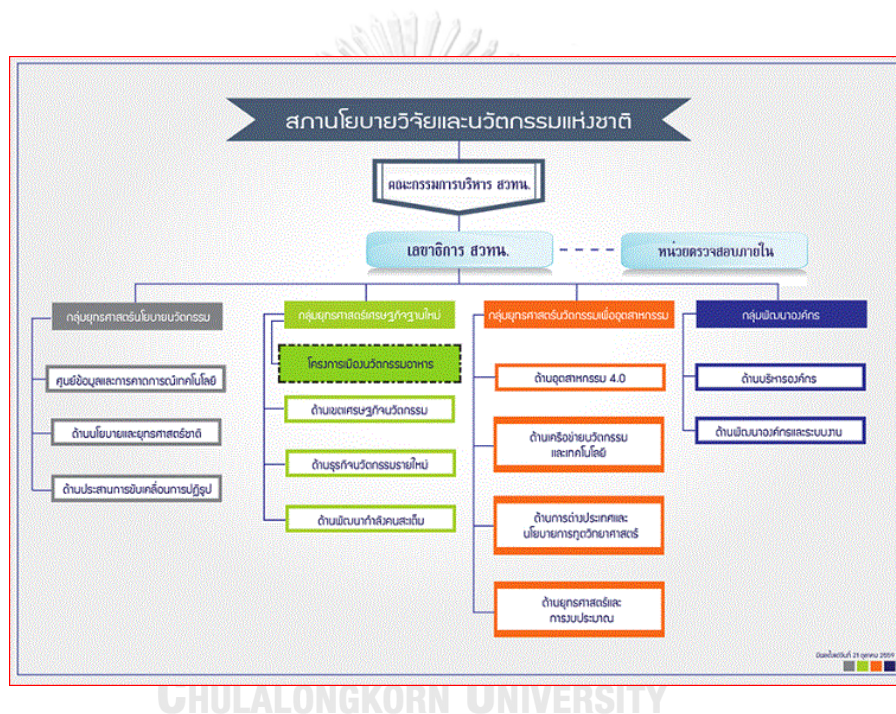


Figure 4.10: STI Office organisation chart (as of June 2018)

The STI Office is operated with a competent team of 107 staff, and an annual budget of approximately 500 million Baht.

Currently, STI Office Secretary General is supported by 3 Deputy Secretary Generals, 5 Assistance Secretary Generals, and 8 Division Directors to promote STI policies and activities in Policy Enabling, Innovation for Industry, New Growth and Competitiveness, and Organisation Management.

4.1.15 Vietnam: Ministry of Science and Technology (MOST)

The Ministry of Science and Technology (MOST) of Vietnam performs functions of the state management of S&T, including carrying out S&T activities, developing S&T potential, managing intellectual property, setting standards, engaging in metrology and quality control, atomic energy and nuclear safety.

MOST, Vietnam is a complex organisation, which includes several state management function units of 11 Departments, 6 Agencies, 5 other Supporting Units (including the Directorate for Standards and Quality (STAMEQ)). There are also other administrative units including 6 Centres for S&T, 5 offices of S&T related activities, 6 institutes for development, and 2 funding agencies. The organisation chart of MOST, Vietnam is shown in Figure 4.10

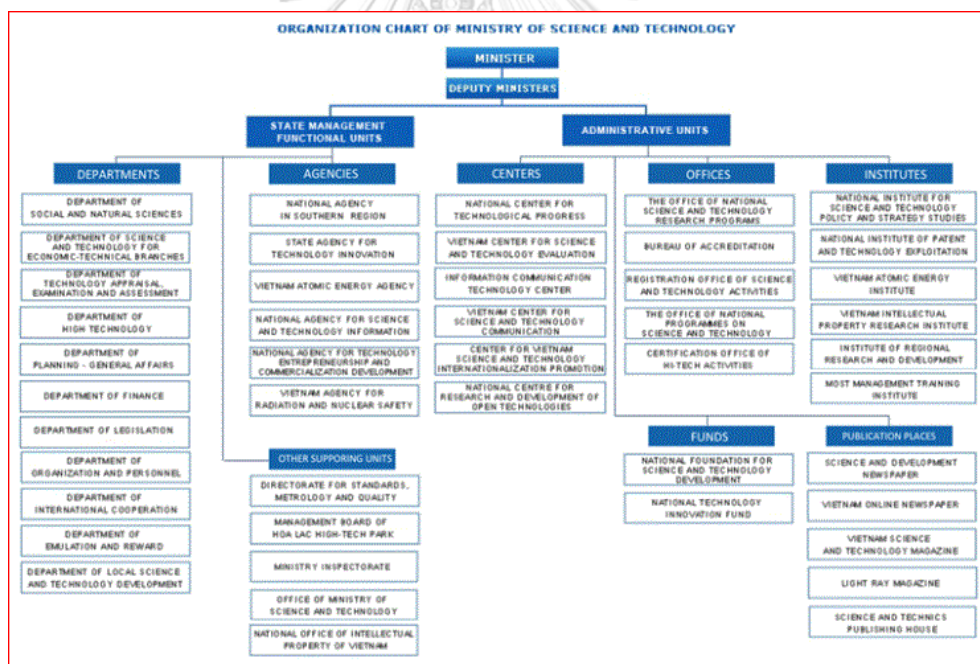


Figure 4.11: Organisation chart of MOST, Vietnam

(Source: <https://sea-eu.net/facts/sea/vietnam> as of June 2018)

The list of the organisations under MOST Vietnam are as follows:

1. Department of Social, Humanity and Natural Sciences.
2. Department of Science and Technology for Economic and Technical Branches.
3. Department of Technology Appraisal, Examination and Assessment.
4. Department of High Technology.
5. Department of Planning and Finance.
6. Department of Legislation.
7. Department of Organization and Personnel.
8. Department of International Cooperation.
9. Department of Emulation and Reward.
10. Department of Local Science and Technology Development.
11. Office of Ministry of Science and Technology.
12. Ministry Inspectorate.
13. National Agency in Southern Region.
14. State Agency for Technology Innovation.
15. Vietnam Atomic Energy Commission.
16. National Agency for Science and Technology Information.
17. National Agency for Technology Entrepreneurship and Commercialization Development.
18. Vietnam Agency for Radiation and Nuclear Safety.
19. National Office of Intellectual Property of Vietnam.
20. Directorate for Standards, Metrology and Quality.
21. Management Board of Hoa Lac Hi-Tech Park.
22. Institute for Science, Technology and Innovation.
23. Science and Development Newspaper.
24. Vietnam Science and Technology Magazine.
25. Information Technology Center.

4.1.16 Vietnam: National Institute for Science and Technology Policy and Strategy Studies (NISTPASS)

The National Institute for S&T Policy and Strategy Studies (NISTPASS) is an S&T organisation under the Ministry of Science and Technology (MOST), Vietnam with the main functions to assist the Minister in research studies of S&T management strategies, policies and mechanisms. Leaders of the Institute consist of the Director and Deputy Directors.

Organisational structure of NISTPASS consists of the following divisions:

- Division of Strategic Studies and Forecast
- Division of S&T Human Resource and Organisational System
- Division of S&T Investment and Financial Policies
- Division of Market Technology Renovation and Development Policies
- Division of Post-education Training and Information
- Center for S&T Policy Research Cooperation
- S&T Policy and Management Magazine
- The Administration and Management Office

4.2 Narratives and assessments of organisational innovativeness factors

In this section, the examples of the narratives from the interviews that can represent the characteristics of the eight factors and twenty sub-factors of POINT model are shown along with the assessments of the organisational innovativeness.

The following scales are used to assess the relative existence of the sub-factors of the POINT framework model from the interview narratives with the participated public organisations that were assigned with the numbering codes from no. 1 to no. 16 in the same order of the organisational structures described in Section 4.1 of this chapter.

- | | |
|-----------------|--|
| ● = Present | ◐ = Partially present |
| ○ = Not Present | ☒ = Could not be determined or unclear |

Table 4.2: Number codes for the organisations in Table 4.3 to Table 4.11 assessment of the presence of the twenty sub-factors of POINT model

| Organisation number codes for table 4.3 to table 4.11 | |
|---|--------------------------|
| 1 = ASEAN COST | 9 = Myanmar MOE |
| 2 = ASEAN Secretariat | 10 = Philippines DOST |
| 3 = Brunei MOD | 11 = Singapore A*START |
| 4 = Cambodia MIH | 12 = Thailand MOST |
| 5 = Indonesia RISTEK-DIKTI | 13 = Thailand STI Office |
| 6 = Lao PDR MOST | 14 = Thailand NECTEC |
| 7 = Malaysia MOSTI | 15 = Vietnam MOST |
| 8 = Malaysia SBC | 16 = Vietnam NISTPASS |

4.2.1 Culture innovativeness (F1)

Table 4.3: Culture innovativeness (F1)

| F(1) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Creativity | ● | ● | ☒ | ☒ | ● | ☒ | ☒ | ● | ☒ | ● | ● | ● | ● | ● | ☒ | ● |
| Openness | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Risk | ● | ● | ☒ | ☒ | ● | ☒ | ☒ | ● | ☒ | ● | ● | ● | ● | ● | ☒ | ● |
| NPM | ● | ● | ● | ● | ● | ● | ● | ● | ☒ | ● | ● | ● | ● | ● | ● | ● |

● = Present ○ = Not Present

◐ = Partially present

☒ = Could not be determined or unclear

The results in Table 4.3 show that the four sub-factors of F1: Culture innovativeness namely creativity, openness, risk taking, and NPM were found to be present in Singapore A*STAR (no.11). Creativity and risk taking characteristics could not be determined from the narratives of Brunei MOD (no.3), Cambodia MIH (no.4), Lao PDR MOST (no.6), Malaysia MOSTI (no.7), Myanmar MOE (no. 9), and Vietnam (MOST). The F1: Culture innovativeness sub-factors in ASEAN COST (no.1), ASEAN Secretariat (no.2), and Indonesia RISTEK-DIKTI (no.5) were mostly only partially presence because their organisation structures emphasized government bureaucratic

characteristics that adhere to hierarchical formal record keeping and reporting along the chain of command and do not encourage changes in how things are done. As the results, they have less tendency toward administrative innovation and effective improvements.

Examples of narratives relevant to Culture innovativeness (F1)

“I think the working climate in our lab is quite ok. We see each other as friends and extended family. We can tell each other openly about almost anything and that helps bring us closer together. If anyone has problems or if they think that certain things can be done differently, we can just informally talk it out first and see if anyone else can also come up with another good idea as well.”

“We have normal working hours in the office but there is no formal rule that you have to be in the office all the time. There are a lot of meetings to attend outside the office as well. If you have to stay outside, it’s fine as long as you can finish your assignments and your seniors or your colleges know how to reach you. I mean we can check our emails all the time so why not working from home sometimes and don’t have to unnecessary rush to the office during the rush hours. This way you can save your energy and use it to do other things.”

“Even though they say that if you have any new suggestions to improve things, you can bring it up to us .The rather formal and silo reporting chain of command here can sometimes prevent new ideas to be brought forward to the top positions. I mean all of us have already have a lot of work to do and can hardly keep up at times. If I would like to make a suggestion to improve something that can perhaps be done in a different way, I cannot just say it openly without preparing for the consequence or need to find solid prove to back it up all the way. This normally means more paper work or you will be looked upon oddly like you are being difficult. Therefore, I rather not bring it up altogether.”

“I agree that COST should be more open towards opening up new channels of collaborations with private sector. It seems that we have been saying this for a long time since the Krabi Initiative but we are still struggling to achieve it.”

“We have annual staff retreat so that there is an opportunity to get to know what other people in different divisions are doing in a more relaxing environment. Staff get to discuss and exchange ideas of next year targets and project plans as well.”

4.2.2 Leadership innovativeness (F2)

Table 4.4: Leadership innovativeness (F2)

| F(2) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|-----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Transform | ● | ● | ☒ | ● | ● | ● | ● | ● | ☒ | ● | ● | ● | ● | ● | ● | ● |
| Commit | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

● = Present

○ = Not Present

● = Partially present

☒ = Could not be determined or unclear

The results in Table 4.4 show that the transformation leadership and leadership commitment to innovation sub-factors were found to be partially presence at the ministerial organisational level in ASEAN COST (no.1), ASEAN Secretariat (no.2), Cambodia MIH (no.4), Indonesia RISTEK-DIKTI (no.5), Lao PDR MOST (no.6), Malaysia MOSTI (no.7), and Vietnam MOST (no.15). The leadership innovativeness factor could not be determined from the narratives with Brunei MOD (no.3) and Myanmar MOE (no.9) because the interviewers preferred not to comment on their top ministers and leaders. The leadership innovativeness factor was found to be present in the rest of the organisations at the level of an agency under a ministry.

Examples of narratives relevant to Leadership innovativeness (F2)

“The Secretary General from Vietnam will complete the 5-years term at the end of this year. The new Secretary General is from Brunei Darussalam. With new Sec Gen coming into office, we can expect new changes and initiatives. He already arranged a meeting with all the staff to inform us of his new plans.”

“We need more lead AMS to commit to new high impact projects in order to drive APASTI implementation. Most of the projects proposed by the SC are small scale workshops, trainings, and research studies. To be more visible to the Leaders at the Summit, we need to think of long term projects that should involve private sector.”

“The current Secretary is very active and he has been with the Department for a long time. We are developing new projects to assist the private sector to invest more in R&D and innovation. Firms also generally do not access technical assistance and support from the government or research institutions. So we need to fine new approach to solve this issue.”

“The Minister is very keen on promoting innovation activities from various initiatives and projects such as Thailand 4.0, Startup Thailand, Food Innopolis, Eastern Economic Corridor development projects. So it is a good opportunity for us to propose new projects based on these initiatives.”

“The new President background is in Management and he is the first top executive to come from within the agency. Therefore, he might be able to use new management approach to improve existing practice and norm in order to transform this organisation. We still have to see. But he is certainly committed to promote innovation since innovation is part of our mandates.”

4.2.3 Strategy innovativeness (F3)

Table 4.5: Strategy innovativeness (F3)

| F(3) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Initiation | ● | ● | ● | ◐ | ● | ● | ● | ● | ◐ | ● | ● | ● | ● | ● | ● | ● |
| Follow | ◐ | ● | ● | ● | ◐ | ◐ | ● | ● | ◐ | ● | ● | ● | ● | ● | ● | ● |

● = Present

○ = Not Present

◐ = Partially present

☒ = Could not be determined or unclear

The results in Table 4.5 show that the sub-factors of F3: Strategy innovativeness namely strategic initiation towards innovation and strategic follow-through to mitigate changes were mostly present in all of the interviewed organisations except in ASEAN COST (no.1), Cambodia MIH (no.4), Indonesia RISTEK-DIKTI (no.5), Lao PDR MOST (no.6), and Myanmar MOE (no.9) that they were partially present. All of the organisations followed the mandates and policies of their governments and convert them into their organisation own goals and strategic plans.

Examples of narratives relevant to Strategy innovativeness (F3)

“We updated our vision and mission in 2013 to better reflect our goals to move toward innovation and commercialisation of our knowledge. In my opinion, to be innovative and competitive, we need to constantly update our plans and targets perhaps every 3-5 years at most in order to stay relevant.”

“Most of the industries in Cambodia are small SMEs with low skills. They lack knowledge and access to technology to improve standards and create higher value products. MIH help build their capability by provide access to trainings and linkage to technology. The government developed a national agenda to promote STEM education, R&D investment for innovation, and institutional reforms for Cambodia to become a middle-income country by 2030. The Ministry strategic plans follows the government agenda.”

“Since the drafting completion of the National Science Technology and Innovation Policy and Plan (2012 – 2021), we have been busy implementing various initiatives and projects to drive innovation activities with the private sector. The GERD values have increased from 0.6% in 2014 to 0.95% in 2017. As the private sector continue to invest in R&D, we think that GERD should hit the target of 1.0% this year and reach 1.5% in 2021. These results will not be possible without good strategic plan that taken into account the challenges that we are facing and the policy coherent with the government mandates.”

4.2.4 Workforce innovativeness (F4)

Table 4.6: Workforce innovativeness (F4)

| F(4) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|-----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Motivated | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Capable | ● | ● | ● | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

● = Present

○ = Not Present

◐ = Partially present

☒ = Could not be determined or unclear

The results in Table 4.6 show that all of the public organisations put high emphasis on having IN(09): Motivated and IN(010): Capable workforce since highly skilled employees were seen as one of the important factors for innovative organisations. However, Cambodia MIH (no.4) and Lao PDR MOST (no.6) claimed that they still lacked enough talented and qualified workforce to work in their organisations. On the contrary, Myanmar MOE (no.9) stated that most of their top management employees were graduated with Master degrees or Ph.D because they need to be able to manage and be on par with the university professors and lecturers who hold postgraduate degrees.

Examples of narratives relevant to Workforce Innovativeness (F4)

“Finding skilled workers with the right competency is the problem. When we hire newly graduates, they have no previous work experience and are not ready to do the job right away. We have to send them to various courses and trainings and assign mentors to help teach them how to do their job properly. Therefore, I think capable workforce is essential to organisation success.”

“Talented workforce is the most important factor for our organisation. Talentism is the new capitalism even for government agencies.”

“Government worker salary is rather low in this country but I chose to work in the Ministry because I like the opportunity to serve the public. I also like working in the International Cooperation because I get to travel to various countries to find new collaborative partners and initiate new projects”.

“We offer industrial trainings and work experience to undergraduate students. In fact we are about to have a new student coming in to work with us in March next year. ...We also try to support our researchers to go to present their work in international conferences when possible but they need to show that they have substantial results before getting the approval”.

“Most of the personnel here hold Master degrees or Ph.D. We require at least Master degrees for the policy research positions but these day we mostly hire people with Ph.D. because the nature of the work requires that you need to be able to research and analyse complex problems to come up with policy recommendations and solutions.”

4.2.5 Resources innovativeness (F5)

Table 4.7: Resources innovativeness (F5)

| F(5) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|--------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Budget | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ○ | ● | ● | ● | ● | ○ | ○ |
| R&D | ● | ○ | ● | ○ | ● | ○ | ● | ● | ○ | ● | ● | ○ | ● | ● | ● | ● |
| ICT | ● | ● | ● | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● |

● = Presence

○ = Not Presence

○ = Partially presence

☒ = Cannot be determined or unclear

The results in Table 4.7 show that the organisations from the lower to lower middle income AMS including Cambodia MIH (no.4), Indonesia RISTEK-DIKTI (no.5), Lao PDR MOST (no.6), Myanmar MOE (no.9), Philippines DOST (no.10), Vietnam MOST (no.15), and Vietnam NISTPASS (no.16) claimed that they did not have enough IN(11): Budget and funding for innovation in their organisations. Cambodia and Lao PDR depend on external funding supports from donor agencies such as USAID, EU and World Bank to conduct new projects or initiatives.

As for the IN(12): R&D sub-factor of F5: Resources innovativeness, the results indicated that most of the divisions in the ASEAN Secretariat (no.2) did not involve R&D activities except for the Statistics Division that was tasked to conduct R&D to produce and publish the yearly ASEAN statistics and indicators to be used as online public database and official references. CLMV organisations also had only partial R&D present due to lacks of R&D budgets.

IN(13): ICT and e-government sub-factor refers to combination of the ICT infrastructure such as broadband and wireless internet access for all employees, reliable ICT division to assist with ICT related problems, organisation official website that is regularly updated, and the use of social media platforms to improve daily operations and public engagements. The results showed that most interviewed organisations had the ICT sub-factor fully present except in Cambodia MIH (no.2), Myanmar MOE (no.9) where they were only partially present because of insufficient ICT infrastructure for employees; and Thailand MOST (no.12), and Vietnam NISTPASS (no.16) where their

official websites were only available in the local languages and were not up to date with relevant information for the public.

Examples of narratives relevant to Resources Innovativeness (F5)

“Funding has always been a challenge for us. We do not have enough budget from the government to do all the projects that we want to do. Therefore, we need to strategically select the right projects with the rights partners especially from donor countries and agencies.”

“The government is currently planning to build the Start-up and SME centre near the ministry as an incubator and working space for SMEs. However, the project is rather slow as we still awaiting more funding allocation to this project.”

“For us, funding for R&D and investing in pre-commercialisation is not a problem but rather how to use the funding, which is public tax payer money, justifiably. This is what we need to think about when we decide on embarking a new project and start new initiatives.”

“Researchers need to write a project proposal in order to request for R&D grant from NSTDA. NECTEC and NSTDA are part of Thailand Research Fund Committees and we can access to research funding there as well. More importantly, the proposed research topics need to be coherent with the objectives of the grant to increase the success of receiving the funding.”

“Apart from allocating the budget for R&D activities, our organisation also invests in improving the internal operation systems.”

“We provide laptops to our researchers, personal work stations to supporting staff and we have reliable wireless connection throughout our office buildings. We also use WhatsApp and Lines to communicate internally among different divisions.”

“The corporate affairs public relation division has the responsibility to update our official website regularly with news and event updates. This is important to us since our website is what we inform our clients and the public of what we are doing.”

“Our official website is quite informative and updated regularly. There should be information and data about DOST activities and projects. The public can also follow us on Facebook and Twitter. They can leave comments and contact us via many channels. We also use social media to contact with our regional offices throughout the country”

4.2.6 Management innovativeness (F6)

Table 4.8: Management innovativeness (F6)

| F(6) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Practice | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● |
| Capability | ● | ● | ● | ○ | ● | ○ | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● |

● = Presence

○ = Not Presence

◐ = Partially presence

☒ = Cannot be determined or unclear

The results in Table 4.8 show that most organisations had the presence of the characteristics of the F6: Management sub-factors namely IN(14): Management practice and IN(15): Management capability, except in Cambodia MIH (no.4), Lao PDR MOST (no.6), and Myanmar MOE (no.9) where these sub-factors were both partially present as a results of lack of knowledge management and capability to improve existing operations and effectively implement new initiatives.

Management practice sub-factor was partially present in the ASEAN COST (no.1) and ASEAN Secretariat (no.2) as a result of highly mechanistic and bureaucratic approaches in operation and administration processes and lack of cross-functional coordination with other divisions.

Examples of narratives relevant to Management Innovativeness (F6)

“We would like to find a suitable mechanism and management process to allow staff to move to different department within the Ministry if they request. It is possible to do so now but it is very difficult. Most Indonesia government agencies recruit university graduates and they start at junior positions and climb their way up. It is possible that they might not be suited to that particular role or job requirement later on in their career. So they cannot be moved and we are stuck with people who are not right for the role.”

“Our internal administration process within the ministry is quite slow. If we receive the invitation letter to participate in the COST meeting less than one month before the actual travel date, we may even have to come up with our own money to buy the flight tickets first. Of course we can claim the money back later if we keep all the important supporting documents.”

“When we go to work abroad under the Ministry fund, we need to visit our Embassy in that country in order to get the certified stamp to prove that we are actually here as government representatives on the said dates. This practice may sound dated as there are other ways to prove that you have come to do your job without having to go to the Embassy just for a stamp. But it has been done for a long time and I suppose everyone just gets used to it.”

“I am currently looking for a better knowledge management system that will be more useful and encourage more people to actually use it. We need to discuss among the researchers to decide how to do this properly as there is no point in spending money to create a platform that later on no one will make use of it.”

“We can use the Ministry Credit cards with temporary advanced credit to pay for the cost of organising various events. The Finance & Admin department came up with this idea and it really makes things easier when we need to travel abroad so that we don’t need to carry so much cash or use our own credit cards to pay and reclaim.”

4.2.7 Performance innovativeness (F7)

Table 4.9: Performance innovativeness (F7)

| F(7) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Outputs | ○ | ○ | ● | ● | ○ | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ○ | ● |
| Process | ○ | ○ | ○ | ○ | ● | ○ | ● | ● | ○ | ○ | ● | ○ | ● | ○ | ○ | ○ |
| Evaluation | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● |

● = Presence

○ = Not Presence

◐ = Partially presence

☒ = Cannot be determined or unclear

The results in Table 4.9 show that IN(16): Innovative outputs were partially present in the ASEAN COST (no.1), ASEAN Secretariat (no.2), Brunei MOD (no.3), Cambodia MIH (no.4), Indonesia RISTEK-DIKTI (no.5), Lao PDR MOST (no.6), Myanmar MOE (no.9), and Vietnam MOST (no.15). These organisations did not effectively produced satisfactory innovative outputs such as new and improved public programs and initiatives, research articles, and official reports. IN(16): Innovative outputs were mentioned and fully present in other organisations.

The assessment of IN(17): New processes sub-factor of F7: Performance innovativeness revealed that IN(17) was present in Indonesia RISTEK-DIKTI (no.5) because after merging the two previous ministries into one, RISTEK-DIKTI needed to reform their internal work process to manage the new divisions within the ministry. Malaysia MOSTI (no.7) and SCB (no.8) also had full presence of IN(17): New processes sub-factor because they managed the client relationships via specific client charters that pledge to improve service delivery to the public.

Most of the organisations had IN(18): Effective evaluation and performance reward system in place that are linked and translated to departmental activities and operations except in ASEAN COST (no.1), ASEAN Secretariat (no.2), and Myanmar MOE (no.9) where this sub-factor was only partially present due to lack of effective and impartial external audits of the KPIs and performance evaluation mechanism.

Examples of narratives relevant to Performance Innovativeness (F7)

“The KPI system for staff was updated earlier this year. We do the EPA appraisal form online now and that make things easier for everyone. We no longer have the problem that we used to have that the percentage contributions to the projects filled in by project members do not match the overall scores anymore.”

“We use balanced scorecard to keep track of the targets and the actual outputs and performance of our projects. But it is a good idea to try a new tool and see if we can improve on any criteria to be more innovative.”

“MOST developed a new central online project monitoring system and is currently coordinate with the representatives from all the agencies to login to the system and update the progress of their projects on a monthly basis. This way, MOST can keep track and monitor especially the key important projects that we previously committed to deliver to the Minister.”

“MOSTI have client charter to improve the service delivery such as process and inform applicants of the R&D funding decision within 50 days and to ensure that STI’s online data and information provided are always up to date. This is part of MASTIC functions to provide S&T information and publishes national surveys on R&D and the Malaysian S&T Index Report.”

4.2.8 Networks & External contexts innovativeness (F8)

Table 4.10: Networks & External contexts innovativeness (F8)

| F(8) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Networks | ● | ● | ● | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● |
| External | ● | ● | ● | ● | ● | ○ | ● | ● | ○ | ● | ● | ● | ● | ● | ○ | ○ |

● = Presence

○ = Not Presence

◐ = Partially presence

☒ = Cannot be determined or unclear

The results in Table 4.10 reveals that most of the organisations had fully present IN(19): Collaborative networks and IN(20): Favourable external contexts for innovation sub-factors of F8: Networks & External contexts innovativeness. The exceptions are Myanmar MOE (no.9) where both sub-factors were partially present and Cambodia MIH (no.4), Lao PDR (no.6), and Vietnam MOST (no.15) where IN(20) sub-factor was partially present due to lack of political mandates and intensive government policies to promote innovation in comparison to other ASEAN member countries.

Examples of narratives relevant to Networks & External contexts innovativeness (F8)

“We hire external experts from universities, private companies both locally and abroad to help us with extraction processes. We recently hire an expert from Australia to come to stay with us for ten days to help train our staff to use the new technology and make use of the microorganism database depository.”

“We always seek new corporation with other partners especially from private companies or new investors. In fact we are in the process of negotiation with a company in turning the essential oil of one of the local plants into an aroma therapeutic products.”

“The government has introduced the Eastern Economic Corridor as a new growth hub that will help the country cope with regional economic changes from ASEAN, East Asia and South Asia and is currently working on new laws to promote the potential of Thai entrepreneurs to help them compete in EEC. This helps boost cooperation between public-private partnership in promoting and investing in the project”

“Startup Thailand is now a platform and networking channel for entrepreneurs, academic institutes, and potential investors to meet and able to come up with new innovative products. To get it launched, we need to collaborate with various partners from different agencies both in MOST and other ministries. We have come quite far from when we started the project back in 2016 and launched various Startup Thailand events across different regions.”

“We rely on in-kind and in-cash supports from donors and NGOs, therefore we need to maintain good working collaborative partnerships with them.”

“COST has been trying to find suitable channels and mechanisms to better engage with private sector. But so far we have not been able to make much progress.

4.3 Comparison of POINT sub-factors in ASEAN

The organisational levels of analysis in the qualitative results (n=16) covered the three levels of a ministry (n1 = 11), an agency under a ministry (n2 = 4), and a division or unit under an agency under a ministry (n3 = 1) and the same levels of analysis were also followed in the subsequent quantitative online survey.

The results of the initial ratings of the POINT 20 sub-factors of the 16 interviewed organisations (Table 4.2) are compared and shown in Table 4.11. The rating symbols are assigned with the following scores:

- Score 3 ● = Presence
- Score 2 ◐ = Partially presence
- Score 1 ○ = Not Presence
- Score 0 ☒ = Cannot be determined or unclear

The purpose of the conversion from the symbolic rating to numerical rating is to quantitatively compare and conclude the initial OI subjective rating scores of the participated organisations based on the interview narratives, comments, and own opinions of the researcher in order to examine whether the proposed 20 sub-factors of POINT were present or not.

The results in Table 4.11 show that No.11 Singapore A*STAR had the top full score of 60 (20 sub-factors x 3), followed by No.8 Malaysia SCB and No.13 Thailand STI Office both ranked second with the score of 59, and third is No.10 Philippines DOST with the score 56.

No.9 Myanmar MOE with the score of 34 was ranked last at 16th place. It should be noted here that the reason that Myanmar was assigned with low initial OI score may not truly reflect the actual OI because some sub-factors of POINT model were not mentioned during the interviews and therefore, could not be extracted. Other organisations with low initial rating score include No.6 Lao PDR MOST with the score of 42 (ranked 15th) and No.4 Cambodia MIH with the score of 44 (ranked 14th).

**Table 4.11: Initial ratings of POINT 20 sub-factors
of the interviewed organisations**

| F1 Culture | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|--------------------|------------|-------------|-------------|-------------|------------|-------------|------------|------------|-------------|------------|------------|------------|------------|------------|-------------|------------|
| Creativity | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 2 | 3 | 3 | 3 | 3 | 0 | 3 |
| Openness | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 |
| Risk | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 3 | 2 | 2 | 2 | 0 | 2 |
| NPM | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| Total | 9 | 8 | 5 | 5 | 8 | 4 | 6 | 11 | 2 | 10 | 12 | 9 | 11 | 10 | 4 | 10 |
| F2 Leader | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Transform | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| Commit | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Total | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 6 | 2 | 6 | 6 | 6 | 6 | 6 | 5 | 6 |
| F3 Strategy | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Initiation | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Follow | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Total | 5 | 6 | 6 | 5 | 5 | 5 | 6 | 6 | 4 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| F4 Work | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Motivated | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Capable | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Total | 6 | 6 | 6 | 5 | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| F5 Resource | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Budget | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 |
| R&D | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| ICT | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Total | 9 | 8 | 9 | 7 | 8 | 7 | 9 | 9 | 6 | 8 | 9 | 8 | 9 | 9 | 8 | 8 |
| F6 Manage | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Practice | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Capability | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Total | 5 | 5 | 6 | 4 | 5 | 4 | 6 | 6 | 4 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| F7 Perform | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Outputs | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| Process | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| Evaluation | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Total | 6 | 6 | 7 | 7 | 8 | 7 | 9 | 9 | 6 | 8 | 9 | 8 | 9 | 8 | 7 | 8 |
| F8 Networks | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Networks | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| External | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Total | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 6 | 4 | 6 | 6 | 6 | 6 | 6 | 5 | 5 |
| Sum | 51 | 50 | 48 | 44 | 51 | 42 | 53 | 59 | 34 | 56 | 60 | 55 | 59 | 57 | 47 | 55 |
| Ranking | (9) | (11) | (12) | (14) | (9) | (15) | (8) | (2) | (16) | (5) | (1) | (6) | (2) | (4) | (13) | (6) |

ASEAN COST network at the ASEAN Secretariat is the central coordination and management unit with the primary roles to coordinate and assist all the ASEAN member countries in the STI international collaboration. Noticeably, in Table 8.3, No.1 ASEAN COST and No.2 ASEAN Secretariat both had low scores of 51 (ranked 9th) and 50 (ranked 11th). Low scores observed can be explained by the fact that both ASEAN COST and ASEAN Secretariat had the typical of bureaucratic organisation structure that emphasize formal impersonal ostensibly rational with clearly defined authorities, chain of command, and responsibilities among actors, formal record keeping, and uniform application of standard rules and procedures. This type of organisational bureaucracy in which decision-making processes are centralized, work processes are formalized and standardised, promote efficiency but do not encourage innovation. Innovative changes of this type of bureaucratic organisations normally occur by the top leader of change in government policy via top-down approach.

When comparing the initial rating results of all the 20 POINT sub-factors at different organisational levels, all of the ministers had lower scores than their counterpart agencies in the same countries. For example, No.15 Vietnam MOST has the initial rating 20 sub-factors score of 47 (14th rank) compared to No.16 NISTPASS with the score of 55 (6th ranks). This could be because the ministry is more bureaucratic and incumbent in its management and governance adhering to more formal procedures and routines to serve top minister than its smaller subsidiary agency.

CHAPTER 5

QUANTITATIVE RESULTS AND STATISTICAL ANALYSIS

The results of the quantitative empirical research survey and statistical analysis via EFA, CFA, and SEM to test the proposed structural and relationship framework models of POINT are discussed in this chapter.

5.1 Results of content validity

The results of the IOC survey received from the 12 experts that completed the questionnaire are summarised in Table 5.1 below in which V means that the item was valid to be included in the POINT measurement scales. The lists of the 60 item statements of the eight proposed factor of POINT were selected based on the literature reviews and in-depth interviews. The Expert No. in the Table 5.1 is correspondent to the list of the experts in Appendix 4 who agreed to participate in the IOC survey. The IOC experts were invited from the researchers with the expertise in innovation management and the potential users of POINTinno.com web-based application.

**Table 5.1: Results of the IOC survey to test content validity
of the proposed item statements (n=12)**

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|--|-------------------|----|----|---|---|---|---|---|---|----|----|----|-----|------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| F1: Culture (IT01 – IT09) | | | | | | | | | | | | | | | |
| F1: (IT01) In this organisation, staff are always encouraged to come up with new ideas and original approaches when dealing with problems in the workplace. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ |
| F1: (IT02) This organisation constantly innovates in order to deliver new and better outputs and | 1 | -1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.67 | ✓ |

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|---|-------------------|---|----|----|---|---|----|---|---|----|----|----|------|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| In this organisation, employees are constantly motivated and self-driven to deliver better services, improved outputs, and values to the public. | | | | | | | | | | | | | | | |
| (IT25) Most of this organisation workforce is educated to post-graduated levels of master or doctoral degrees. | -1 | 1 | 0 | 0 | 1 | 1 | -1 | 1 | 0 | 1 | 1 | 1 | 0.42 | X | |
| (IT26) In this organisation, employees are highly skilled with relevant expertise suitable to their job descriptions and duties. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ | |
| (IT27) In this organisation, employees often have opportunities to participate in trainings, workshops, and further education that suit their interests to improve their skills and knowledge. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ | |
| (IT28) In this organisation, employees are generally recognised as very talented and highly capable in their jobs by other organisations. | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ | |
| F5: Resources (IT29 – IT36) | | | | | | | | | | | | | | | |
| (IT29) This organisation has sufficient budgets or funds allocated specifically to continually develop new initiatives and better programmes, products, processes, and services to the public. | 1 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ | |
| (IT30) This organisation has sufficient budgets or funds allocated specifically to continually improve internal work processes, practices, and operations of the organisation. | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ | |
| (IT31) This organisation invests in in-house R&D unit | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ | |

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|--|-------------------|---|----|---|---|---|---|---|---|----|----|----|-----|------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| F6: Management (IT37 – IT43) | | | | | | | | | | | | | | | |
| (IT37) This organisation has instruments e.g. manuals, databases, files, organisational routines that allow what has been learnt in the past situations or projects to remain valid and help the work processes to operate smoothly and effectively, although the employees are no longer the same. | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT38) Management of this organisation promotes cross-functional teamwork among different departments/units within the organisation in order to share expertise and achieve the best results and outcomes. | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT39) In this organisation, employees are well placed in positions and divisions suitable to their responsibilities, capabilities and skills. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0.92 | ✓ |
| (IT40) The management structure of this organisation is of suitable size, hierarchy, and chains of commands that can effectively carry out the organisational functions and mandates as well as quickly response to changes in plans, strategies, and operations. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT41) In this organisation, management and human resource department are capable of developing, promoting and retaining talented or high performing employees. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.00 | ✓ |
| (IT42) | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|---|-------------------|---|----|---|---|---|---|---|---|----|----|----|------|------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| In this organisation, management can often provide useful insights, feedbacks and comments that help to identify potential opportunities and eliminate problems. | | | | | | | | | | | | | | | |
| (IT43) In this organisation, management ensures that new work processes and developments that may be helpful to the organisation as a whole are usually discussed and shared with all employees. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ |
| F7: Performance (IT44 – IT54) | | | | | | | | | | | | | | | |
| (IT44) In the last three years, this organisation has consistently produced innovative outputs such as new and improved products and services, new patents, new designs and copyrights, new programmes, new initiatives, projects, and policies. | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT45) In the last three years, this organisation has consistently produced high number of research articles in well-respected national and international journals as well as other high quality publications such as official reports, white papers, and newsletters etc. that help enhance public knowledge. | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT46) In this last three years, this organisation has consistently achieved its annual targets, objectives, and KPIs. | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.83 | ✓ | |
| (IT47) In the last three years, in comparison with other peer organisations with similar functions and mandates in the same country, this | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.92 | ✓ | |

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|---|-------------------|---|----|---|---|---|---|---|---|----|----|----|------|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| organisation consistently outperforms them. | | | | | | | | | | | | | | | |
| (IT48) In the last three years, in comparison with other peer organisations with similar functions and mandates internationally or globally, this organisation consistently outperforms them. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.92 | ✓ | |
| (IT49) In the last three years, this organisation consistently commit to routinely track and communicate its results and performances to external stakeholders via e.g. annual reports, stakeholders meetings, online discussion forums, network meetings, conferences and seminars etc. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.92 | ✓ | |
| (IT50) In the last three years, this organisation has successfully updated existing internal work processes and operational methods that result in improvement of organisational effectiveness, efficiency, productivities, and performance. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ | |
| (IT51) In the last three years, this organisation has routinely conducted users' satisfactory surveys measuring the organisational performances and successfully utilised the results to improve existing operations and practices. | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.75 | ✓ | |
| (IT52) This organisation has effective and efficient performance measurement system in place (e.g. balanced scorecard, management dashboard, | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ | |

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|--|-------------------|---|----|---|---|---|---|---|---|----|----|----|------|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| report card, and KPI trackings etc.) that are utilised and followed-through by all employees in order to monitor and ensure that the mission and vision of success are linked and translated to actual organisational unit activities and operations. | | | | | | | | | | | | | | | |
| (IT53) In the last three years, this organisation has effectively and efficiently utilised independent, and impartial internal audit department that constantly monitors, evaluates, and provides feedbacks and recommendations to improve daily operations and performance of all organisational division units. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.92 | ✓ | |
| (IT54) In the last three years, this organisation has been successfully complied to independent and impartial external audit and/or panel of experts that evaluates its targets, KPIs and performance. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.92 | ✓ | |
| F8: Networks & External contexts (IT55 – IT60) | | | | | | | | | | | | | | | |
| (IT55) This organisation establishes and able to maintain good national collaborative networks and research cooperation with other innovative organisations. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.83 | ✓ | |
| (IT56) This organisation establishes and able to maintain good international collaborative networks and research cooperation with other innovative organisations. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.83 | ✓ | |
| (IT57) This organisation engages with and benefits from cross-sectoral collaborative | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ | |

| Item statements | Expert No. rating | | | | | | | | | | | | IOC | V | |
|---|-------------------|---|----|---|---|---|---|---|---|----|----|----|-----|------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| partnerships with other public agencies, private business enterprises, universities and non-profit organisations. | | | | | | | | | | | | | | | |
| (IT58) This organisation fully benefits from national and/or local government policies and regulations that promote innovations and innovation related activities. (Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units). | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT59) This organisation is consistently able to receive external financial supports, from the national and/or local governments and/or private businesses or foundations to invest in innovations and innovation related activities. (Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units). | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.83 | ✓ |
| (IT60) Government policies, laws and regulations, and political mandates and climates help foster innovation and innovation related activates in this organisation. | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.92 | ✓ |

From the Table 5.1, results of the IOC survey to test content validity of the proposed item statements in POINT factors, the values of the indexes of IOC of all the items rated by the experts are all above 0.50 except for (IT25): ‘Most of this organisation workforce is educated to post-graduated levels of master or doctoral degrees’, which has the index of IOC of 0.42 below the cut-off minimum value at 0.50. The reason for this could be because the experts think that an innovative organisation public organisation does not necessary need to employ workforce with post-graduate degrees in order to achieve its goals. Therefore, the (IT25) item statement under Factor 4: Workforce Innovativeness is left out in the next phase of the quantitative online survey to measure OI of public organisations in ASEAN.

5.2 Descriptive statistics results of the online survey on organisational innovativeness of public agencies in ASEAN

5.2.1 Demographic Results of the Respondents

The demographic results of the survey respondents are shown in Table 5.2 below.

Table 5.2: Demographic results of the respondents

| Demographic of survey respondents | Public organisations | |
|-----------------------------------|----------------------|------------|
| | Number | Percentage |
| Sex | | |
| Male | 110 | 38.0 |
| Female | 179 | 61.7 |
| Others | 1 | 0.3 |
| Total | 290 | 100.0 |
| Age | | |
| Below 25 years old | 2 | 0.7 |
| 25-35 years old | 95 | 32.8 |
| 36-45 years old | 114 | 39.3 |
| 46-55 years old | 51 | 17.6 |
| 56-65 years old | 26 | 9.0 |
| More than 65 years old | 2 | 0.7 |

| Demographic of survey respondents | Public organisations | |
|--|----------------------|------------|
| | Number | Percentage |
| Total | 290 | 100.0 |
| Current employment position level | | |
| Top executive director, deputy director, or equivalent | 25 | 8.6 |
| Middle management | 74 | 25.5 |
| Senior employee | 99 | 34.1 |
| Junior employee | 90 | 31.0 |
| Student/ Training | 2 | 0.7 |
| Total | 290 | 100.0 |
| Number of years in the current position | | |
| Less than 1 year | 26 | 9.0 |
| 1-3 years | 112 | 38.6 |
| 4-6 years | 71 | 24.5 |
| More than 6 years | 81 | 27.9 |
| Total | 290 | 100.0 |
| Number of years working in the organisation | | |
| Less than 1 year | 20 | 6.9 |
| 1-5 years | 78 | 26.9 |
| 6-10 years | 58 | 20.0 |
| 11-20 years | 88 | 30.3 |
| More than 20 years | 46 | 15.9 |
| Total | 290 | 100.0 |
| Highest education qualification | | |
| Ph.D. | 72 | 24.8 |
| Master's degree | 166 | 57.2 |
| Bachelor's degree | 47 | 16.2 |
| Below Bachelor's degree | 5 | 1.7 |
| Total | 290 | 100.0 |
| Areas of expertise and formal qualifications (More than one answer can be selected) | | |
| Science, technology, engineering, and mathematics (STEM) | 187 | 64.5 |
| Healthcare and medicine | 16 | 5.5 |
| Industry, trading, and manufacturing | 13 | 4.5 |
| Education and teaching | 48 | 16.6 |
| Economy, finance, and accountancy | 23 | 7.9 |

| Demographic of survey respondents | Public organisations | |
|---|----------------------|------------|
| | Number | Percentage |
| Management and business administration | 64 | 22.1 |
| Politics and public policy | 44 | 15.2 |
| Laws and security enforcement | 10 | 3.4 |
| Social studies (including arts, culture, history, sports, media, and entertainment) | 27 | 9.3 |
| Others | 21 | 7.2 |
| Total | 290 | 100.0 |

The demographic results in Table 5.2 (n = 290) show that most of the respondents were female with 179 responses (61.7%) compared to male with 110 responses (38.0%) and others with 1 responses (0.3%). The high ratio of female to male respondents reflects the fact there were relatively higher number of women than men working in the public organisations under the Ministry of Science and Technology of Thailand, which were the majority of the respondents in this survey.

The respondents' age groups were mostly in the range of 36-45 years old with 114 responses (39.3%), followed by 25-35 years old with 95 responses (32.8%), and 46-55 years old with 51 responses (17.6%). The mature age groups mirror the fact that most respondents were senior employees with 99 responses (34.1%), followed by junior employees with 90 responses (31.0%), and middle management with 74 responses (25.5%).

Most respondents in the public organisations said that they have been in their current position for 1–3 years with 112 responses (38.6%), followed by more than 6 years with 81 responses (27.9%), and 4-6 years with 71 responses (24.5%). The results showed that they have been working in their organisations for 11–20 years with 88 responses (30.3%), followed by 1-5 years with 78 responses (26.9%), and 6-10 years with 58 responses (20.0%) respectively. The highest educations of the respondents from were Master's degrees with 166 responses (57.2%), followed by Ph.D. with 72 responses (24.8%).

Their areas of expertise and formal qualifications were mostly science, technology, engineering, and mathematics (STEM) with 187 responses (64.5%) and management and business administration with 64 responses (22.1%). The results showed that the respondents' expertise and qualification backgrounds were in accordance with the functions of the participated public organisations to promote and develop STI.

5.2.2 Demographic results of the participating organisations in the survey

The demographic results of the participating organisations are shown in Table 5.3 below.

Table 5.3: Demographic results of the participating organisations in the survey

| Demographic of participating organisation | Public organisations | |
|---|----------------------|------------|
| | Number | Percentage |
| Country that the organisation is located in | | |
| Brunei Darussalam | 5 | 1.7 |
| Cambodia | 9 | 3.1 |
| Indonesia | 17 | 5.9 |
| Lao PDR | 11 | 3.8 |
| Malaysia | 21 | 7.2 |
| Myanmar | 3 | 1.0 |
| Philippines | 10 | 3.5 |
| Singapore | 14 | 4.8 |
| Thailand | 191 | 65.9 |
| Vietnam | 9 | 3.1 |
| Total | 290 | 100.0 |
| Sector of the organisation | | |
| Public / Government sector | 268 | 92.4 |
| Academic/ Education sector | 22 | 7.6 |
| Total | 290 | 100.0 |
| Overall | | |
| Number of staff in the organisation | | |

| Demographic of participating organisation | Public organisations | |
|---|----------------------|------------|
| | Number | Percentage |
| 1 – 50 | 10 | 3.4 |
| 51- 100 | 18 | 6.2 |
| 101 – 200 | 56 | 19.3 |
| 201 – 400 | 70 | 24.1 |
| 401 –700 | 61 | 21.0 |
| 701 –1000 | 14 | 4.8 |
| 1,001 – 2000 | 13 | 4.5 |
| More than 2000 | 48 | 16.6 |
| Total | 290 | 100.0 |
| Sector areas that the organisation main functions and mandates are associated with (More than one answer can be selected) | | |
| Science, technology, and innovation (STI) | 225 | 77.6 |
| Information and communication technology (ICT) | 18 | 6.2 |
| Public administration and service | 22 | 7.6 |
| Education and teaching | 50 | 17.2 |
| Culture, tourism, history, and arts | 7 | 2.4 |
| Sport and entertainment | 1 | 0.3 |
| Industry manufacturing and production | 38 | 13.1 |
| Energy sector | 11 | 3.8 |
| Agriculture and food | 27 | 9.3 |
| Healthcare and medicine | 21 | 7.2 |
| Natural resources and environment | 30 | 10.3 |
| Law, military and national security | 2 | 0.7 |
| Financial and economic sector | 9 | 3.1 |
| Foreign relations and diplomat sector | 14 | 4.8 |
| Others | 23 | 7.9 |
| Are the functions and mandates of your organisation related to the development and promotion of science, technology, and innovation (STI) activities? | | |
| Yes | 259 | 89.3 |
| No | 31 | 10.7 |
| Total | 290 | 100.0 |

The results in Table 5.3 show that 191 responses (65.9%) or nearly two third were located in Thailand, followed by Malaysia with 21 responses (7.2%), and Indonesia with 17 responses (5.9%). Over 92% were from public sector and the rest were from academic or education sector. Most organisations (24.1%, 70 responses) had number of staffs from 201 – 400, followed by 401 – 700 (21.0%, 61 responses). The majority of the organisation (89.3%, 259 responses) had their main functions associated with STI.

The results of the organisational hierarchy levels and types of the public organisations are shown in Table 5.4 below.

Table 5.4: Results of organisation hierarchy levels and types of the public organisations

| Demographic of Participating Organisation | Number | Percentage |
|---|--------|------------|
| The levels of organisation hierarchy that the respondents are rating their OI | | |
| National/ state ministry level or equivalent | 74 | 25.5 |
| An agency under a national/ state ministry level or equivalent | 184 | 63.4 |
| A division under an agency under a national/ state ministry level or equivalent | 22 | 7.6 |
| Others | 10 | 3.4 |
| Total | 290 | 100.0 |
| Types of the public organisation | | |
| International government agency | 8 | 2.8 |
| Civil government agency | 168 | 57.9 |
| State-owned enterprise | 11 | 3.8 |
| Government public corporation | 50 | 17.2 |
| Autonomous or independent public organisation | 47 | 16.2 |
| Others | 6 | 2.1 |
| Total | 290 | 100.0 |

The results in Table 5.4 show that the levels of organization hierarchy that the respondents were rating were mostly at the level of an agency under a national/ state ministry level or equivalent with 184 responses (63.4%), followed by a national or state

ministry level with 74 responses (25.5%), and a division under an agency under a national or state ministry level or equivalent with 22 responses (7.6%). The types of the organisations were mostly civil government agency with 168 responses (57.9%) followed by government public corporation with 50 responses (17.2%).

Table 5.5: Motivations for working in public organisations

(More than 1 answers can be selected, n =290)

| Motivations | Number | Percentage |
|--|--------|------------|
| Job security | 222 | 76.6 |
| Career progression | 119 | 41.0 |
| Altruism – wanting to serve the public | 116 | 40.0 |
| Health insurance package and/or other benefits | 70 | 24.1 |
| Opportunities for further training and education | 69 | 23.8 |
| Fulfilling scholarship bonds/contracts | 32 | 11.0 |
| Attractive salary or income | 25 | 8.6 |
| Others | 14 | 4.8 |

The survey results in Table 5.5 show that the motivations of the respondents for working in public organisation were for job security with the highest responses of 222 or 76.6%, followed by career progression with 119 responses or 41%. The least motivation factors were attractive salary with 25 or 8.6% and fulfilling scholarship bonds or contracts with 32 responses or 11%.

5.3 Results of public perception and assessment of ASEAN COST and associated groups

Table 5.6: Results of public perception and assessment of ASEAN COST and associated groups

| Assessment | No. of Responses | Percentage |
|--|------------------|------------|
| Respondents have heard of, attended meetings, or collaborated with ASEAN COST and AMMST | | |
| Yes | 112 | 38.6 |
| No | 167 | 57.6 |
| (Missing) | 11 | 3.8 |
| Total | 290 | 100.0 |
| Respondents have heard of, attended meetings, or collaborated with any of the subsidiaries associated with ASEAN COST. More than one answer can be selected. | | |
| BAC | 60 | 49.6 |
| ABAPAST | 64 | 52.9 |
| ABASF | 51 | 42.1 |
| Krabi Initiative | 73 | 60.3 |
| APASTI 2016-2025 | 87 | 71.9 |
| SCB | 27 | 22.3 |
| SCFST | 23 | 19.0 |
| SCIRD | 51 | 42.1 |
| SCMG | 23 | 19.0 |
| SCMIT | 25 | 20.7 |
| SCMSAT | 22 | 18.2 |
| SCMST | 21 | 17.4 |
| SCSER | 23 | 19.0 |
| SCOSA | 23 | 19.0 |
| No, never heard of, attended meetings, or collaborated with any of ASEAN COST associated subsidiaries. | 169 | 58.3 |
| Total | 290 | 100.0 |
| Respondents have heard of, attended meetings, or collaborated with any of the dialogue partners associated with ASEAN COST? More than one answer can be selected. | | |
| ASEAN-China JSTC | 41 | 48.2 |

| Assessment | No. of Responses | Percentage |
|---|------------------|------------|
| ASEAN-EU DST | 58 | 68.2 |
| ASEAN-India WGST | 22 | 25.9 |
| ASEAN-Japan CCST | 41 | 48.2 |
| ASEAN-ROK JSTC | 43 | 50.6 |
| ASEAN-Russia WGST | 17 | 20.0 |
| ASEAN-US CST | 35 | 41.2 |
| ASEAN COST+3 | 35 | 41.2 |
| No, never heard of, attended meetings, or collaborated with any of the above dialogue partners associated with ASEAN COST. | 205 | 70.7 |
| Total | 290 | 100.0 |
| <p>Respondents have heard of, attended meetings, or collaborated with any of the following networks and centres established under ASEAN COST. More than one answer can be selected.</p> | | |
| TTF-TW (Technical Task Force on Tsunami Warning under SCMG) | 8 | 10.0 |
| TWG-NPP (Technical Working Group on Nuclear Power Plant under SCSE) | 10 | 12.5 |
| EGM (Experts Group on Metrology under SCIRD) | 34 | 42.5 |
| ASEAN Large Nuclear and Synchrotron Network | 19 | 23.8 |
| ASEAN Network for Nuclear Power Safety Research | 9 | 11.3 |
| ASEAN Network on Microbial Utilization (AnMicro) | 19 | 23.8 |
| ASEAN Network for Drugs, Diagnostics and Vaccines Innovation (ASEAN-NDI) | 10 | 12.5 |
| ASEAN Hydroinformatics and Climate Data Center (AHC) | 9 | 11.3 |
| ASEAN Research and Training Centre for Space Technology and Applications (ARTSA) | 8 | 10.0 |
| ASEAN Specialised Meteorology Centre (ASMC) | 7 | 8.8 |
| ASEAN Earthquake Information Centre (AEIC) | 5 | 6.3 |

| Assessment | No. of Responses | Percentage |
|---|------------------|------------|
| ASEAN Journal for S&T Development (AJSTD) | 36 | 45.0 |
| ASEAN Science Technology and Innovation Week (ASTIW) | 51 | 63.8 |
| ASEAN Food Conference | 18 | 22.5 |
| ASEAN Specialised Meteorology Center (ASMC) | 3 | 3.8 |
| ASEAN Climate Outlook Forum (ASEANCOF) | 6 | 7.5 |
| Others (Please specify) | 2 | 2.5 |
| No, I have never heard of, attended meetings, or collaborated with any of the above ASEAN COST networks and centres. | 210 | 72.4 |
| Total | 290 | 100.0 |
| <p>If answer Yes to any of the previous questions, how did you know ASEAN COST or any of the associated groups? More than one answer can be selected.</p> | | |
| I used to attend ASEAN COST, AMMST, sub-committees or related group meetings. | 69 | 52.7 |
| I used to be representative of at least one or more of ASEAN COST entities. | 30 | 22.9 |
| I used to work or collaborate with ASEAN COST entities. | 33 | 25.2 |
| My organisation used to collaborate with ASEAN COST entities. | 85 | 64.9 |
| My organisation used to receive funding or grants from ASEAN COST. | 16 | 12.2 |
| My organisation used to provide funding or grants to ASEAN COST. | 16 | 12.2 |
| I heard of ASEAN COST and associated entities via my friends or colleagues. | 55 | 42.0 |
| I heard of ASEAN COST and AMMST meetings via news channels such as TV, radios, newspapers, internet, and social media etc. | 37 | 28.2 |
| Others (Please specify) | 1 | 0.8 |

| Assessment | No. of Responses | Percentage |
|--|------------------|------------|
| No, I have never attended meetings or collaborated with ASEAN COST and associated groups | 159 | 54.8 |
| Total | 290 | 100 |
| If you have previously attended meetings or worked with ASEAN COST projects and associated groups, how do you rate the most recent performance and outcome of such cooperation? | | |
| The performance and outcome of the cooperation are not satisfactory. | 4 | 4.5 |
| The performance and outcome of the cooperation are somewhat satisfactory. | 71 | 80.7 |
| The performance and outcome of the cooperation are very satisfactory. | 2 | 2.3 |
| Not applicable (I have never worked or collaborated with ASEAN COST). | 202 | 69.7 |
| Total | 290 | 100.0 |
| In which of the following areas do you think ASEAN COST and associated groups can be improved to achieve its goals and better serve the public? More than one answer can be selected. | | |
| ASEAN COST and associated groups should be more open and provide easier access channels for public and private sector engagements and collaborations. | 158 | 54.5 |
| ASEAN COST and associated groups should have performance measurement system to indicate whether their policies, programmes, and projects are creating desirable positive output, outcome and impact to the public. | 108 | 37.2 |
| ASEAN COST and associated groups should have performance assessments to indicate whether they are operating effectively and efficiently. | 98 | 33.8 |
| There should be an online system or platform to help ASEAN COST members and the ASEAN Secretariat keep track and monitor the projects' progresses, targets, and KPIs. | 83 | 28.6 |

| Assessment | No. of Responses | Percentage |
|--|------------------|------------|
| The results, outcomes, and impacts of ASEAN COST main projects should be publicly available and open to public feedbacks and comments. | 62 | 21.4 |
| S&T Division at the ASEAN Secretariat as pivotal coordination centre of ASEAN COST should be empowered with more workforce and resources. | 45 | 15.5 |
| ASEAN COST and associated groups should have more online-meetings to collaborate and exchange opinions in order to reduce the duration of annual meeting events. | 46 | 15.9 |
| Others | 23 | 7.9 |
| Total | 290 | 100 |

The results in Table 5.6 show that:

- More than half of the respondents have not heard of, attended meetings, or collaborated with ASEAN COST or AMMST with 167 responses (57.6%).
- Most respondents have not heard of, attended meetings, or collaborated with any of the subsidiaries associated with ASEAN COST with 169 responses (58.3%).
- Most respondents have not heard of, attended meetings, or collaborated with any of the dialogue partners associated with ASEAN COST with 205 responses (70.7%).
- Most respondents have not heard of, attended meetings, or collaborated with any of the networks and centres established under ASEAN COST with 210 responses (72.4%).
- For respondents who have heard of, attended meetings, or collaborated with ASEAN COST and AMMST was mostly because they used to attend ASEAN COST meetings with 69 responses

(23.8%) and rated the performance and outcome of the cooperation as somewhat satisfactory with 71 responses (24.5%).

- Most respondents chose that ASEAN COST and associated groups should be more open and provide easier access channels for public and private sector engagements and collaborations in order to improve or achieve its goals and better serve the public with 158 responses (54.5%).

5.4 Importance rating results of POINT factors

The important rating results of POINT factors are shown in Table 5.7 below.

Table 5.7: Importance Rating of POINT factors (n = 290)

| Factor | Importance Rating | | | | | Mean | SD. |
|---------------|-------------------|-------|-------|-------|-------|------|-------|
| | 1 | 2 | 3 | 4 | 5 | | |
| F1: Culture | 1 | 2 | 13 | 70 | 204 | 4.63 | 0.637 |
| | 0.3% | 0.7% | 4.5% | 24.1% | 70.3% | | |
| F2: Leader | 1 | 3 | 6 | 53 | 227 | 4.73 | 0.585 |
| | 0.3% | 1.0% | 2.1% | 18.3% | 78.3% | | |
| F3: Strategy | 0 | 6 | 20 | 129 | 135 | 4.36 | 0.702 |
| | 0.3% | 2.1% | 6.9% | 44.5% | 46.6% | | |
| F4: Workforce | 0 | 6 | 13 | 80 | 191 | 4.57 | 0.678 |
| | 0.0% | 2.41% | 4.5% | 27.6% | 65.9% | | |
| F5: Resources | 2 | 5 | 23 | 99 | 161 | 4.42 | 0.768 |
| | 0.7% | 1.7% | 7.9% | 34.1% | 55.5% | | |
| F6: Manage | 0 | 5 | 13 | 110 | 162 | 4.48 | 0.666 |
| | 0.0% | 1.7% | 4.5% | 37.9% | 55.9% | | |
| F7: Perform | 1 | 5 | 46 | 148 | 90 | 4.11 | 0.748 |
| | 0.3% | 1.7% | 15.9% | 51.0% | 31.0% | | |
| F8: Network | 0 | 6 | 27 | 125 | 132 | 4.32 | 0.728 |
| | 0.0% | 2.1% | 9.3% | 43.1% | 45.5% | | |

The results in Table 5.7 show that most of the potential users rated all the eight factors of POINT as either 4 (important) or 5 (very important) and the average means can be compared based on the following criteria.

| | |
|-------------|-----------|
| 1.00 – 1.80 | Very low |
| 1.81 – 2.60 | Low |
| 2.61 – 3.40 | Middle |
| 3.41 – 4.20 | High |
| 4.21 – 5.00 | Very high |

Therefore, all the proposed eight factors of POINT were deemed very important to the potential users with the means above 4.20, except F7: Performance Innovativeness (mean = 4.11) that was in the important range. The most important factor was F2: Leadership Innovativeness (mean = 4.73), followed by F1: Culture Innovativeness (mean = 4.63) and F4: Workforce Innovativeness (mean = 4.57).

The important rating results are subsequently utilised and converted into the weighted sum percentages of the eight factors to measure OI in POINTinno.com online application.



5.5 Results of the ASEAN mean average scores of POINT factors

The results of the ASEAN mean average scores of the overall and individual POINT factors are shown in Table 5.8 below.

Table 5.8: Results of the ASEAN mean average scores of POINT factors

| Factor | BN | CM | ID | LA | MS | MM | PH | SG | TH | VN |
|------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| No. of Responses | 5 | 9 | 17 | 11 | 21 | 3 | 10 | 14 | 191 | 9 |
| F1: Culture | 2.93 0.169 | 2.78 0.544 | 2.90 0.558 | 2.74 0.303 | 3.56 0.446 | 2.26 0.064 | 2.99 0.387 | 3.93 0.432 | 3.20 0.798 | 2.93 0.356 |
| F1 Overall POINT Score | 3.18 (0.739) | | | | | | | | | |
| IT01 | 3.60 0.548 | 3.11 0.928 | 3.18 0.636 | 3.27 0.467 | 3.95 0.384 | 2.67 0.577 | 3.50 0.527 | 4.00 0.707 | 3.51 0.951 | 3.44 0.527 |
| IT02 | 3.00 0.000 | 2.67 0.500 | 3.29 0.849 | 3.09 0.539 | 3.86 0.655 | 2.00 0.000 | 3.30 0.675 | 4.46 0.660 | 3.73 0.924 | 3.33 0.500 |
| IT03 | 3.20 0.447 | 2.89 0.601 | 3.18 0.728 | 2.82 0.405 | 3.57 0.598 | 2.00 0.000 | 2.90 0.738 | 3.85 0.376 | 3.34 1.009 | 3.11 0.333 |
| IT04 | 2.60 0.548 | 2.78 0.667 | 2.82 0.728 | 2.64 0.505 | 3.19 0.602 | 2.00 0.000 | 2.70 0.675 | 3.77 0.599 | 3.12 1.016 | 2.67 0.707 |
| IT05 | 3.80 0.837 | 3.33 0.707 | 3.06 0.748 | 3.36 0.505 | 4.19 0.680 | 3.00 0.000 | 3.80 0.422 | 4.54 0.519 | 3.45 0.982 | 3.56 0.726 |
| IT06 | 3.00 0.000 | 3.00 0.707 | 2.76 0.831 | 2.73 0.467 | 3.71 0.717 | 2.33 0.577 | 2.90 0.738 | 4.08 0.494 | 2.92 1.010 | 3.22 0.441 |
| IT07 | 2.60 0.548 | 2.67 0.707 | 2.53 0.514 | 2.18 0.603 | 3.29 0.717 | 2.33 0.577 | 2.50 0.527 | 3.46 0.660 | 2.74 1.049 | 2.67 0.707 |
| IT08 | 2.20 0.447 | 2.33 0.707 | 2.65 0.931 | 2.27 0.467 | 3.05 0.590 | 2.00 0.000 | 2.50 0.527 | 3.54 0.660 | 3.01 1.039 | 2.11 0.601 |
| IT09 | 2.40 0.548 | 2.22 0.667 | 2.59 0.795 | 2.27 0.467 | 3.19 0.602 | 2.00 0.000 | 2.80 0.632 | 3.69 0.751 | 2.97 1.005 | 2.22 0.441 |
| F2: Leadership (IT10 – IT15) | 3.13 0.183 | 2.44 0.514 | 3.08 0.578 | 2.89 0.642 | 3.34 0.544 | 2.50 0.441 | 2.77 0.573 | 3.46 0.472 | 3.31 0.872 | 2.67 0.577 |
| F2 Overall POINT Score | 3.21 (SD. 0.805) | | | | | | | | | |
| IT10 | 3.00 0.707 | 2.44 0.527 | 3.06 0.748 | 2.82 0.874 | 3.52 0.602 | 2.33 0.577 | 2.70 0.675 | 3.69 0.480 | 3.17 1.009 | 2.56 0.726 |
| IT11 | 3.80 0.837 | 3.22 0.667 | 3.71 0.588 | 3.91 0.831 | 3.86 0.727 | 3.67 0.577 | 3.50 0.972 | 3.77 0.725 | 3.38 1.043 | 3.56 0.726 |
| IT12 | 2.40 1.140 | 1.67 0.707 | 2.41 0.870 | 2.27 0.786 | 2.67 0.856 | 1.67 0.577 | 2.30 0.823 | 2.85 0.689 | 3.19 1.042 | 1.89 0.782 |
| IT13 | 3.00 0.000 | 2.44 0.726 | 3.00 0.707 | 2.55 0.688 | 3.19 0.512 | 2.33 0.577 | 2.60 0.699 | 3.46 0.660 | 3.31 1.035 | 2.44 0.527 |
| IT14 | 3.00 0.000 | 2.67 0.707 | 2.82 0.728 | 2.64 0.674 | 3.38 0.590 | 2.00 0.000 | 2.70 0.483 | 3.62 0.768 | 3.21 1.011 | 2.67 0.707 |
| IT15 | 3.60 0.894 | 2.22 0.441 | 3.47 0.943 | 3.18 0.751 | 3.43 0.676 | 3.00 1.000 | 2.80 0.789 | 3.38 0.768 | 3.62 0.976 | 2.89 0.601 |
| F3: Strategy (IT16 – IT21) | 3.17 0.333 | 2.96 0.455 | 3.42 0.391 | 3.33 0.211 | 3.82 0.405 | 3.11 0.096 | 3.22 0.452 | 4.12 0.478 | 3.47 0.801 | 3.41 0.409 |
| F3 Overall POINT Score | 3.47 (SD. 0.722) | | | | | | | | | |

| Factor | BN | CM | ID | LA | MS | MM | PH | SG | TH | VN |
|---------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| IT16 | 3.60 0.548 | 2.89 0.333 | 3.59 0.618 | 3.27 0.467 | 3.81 0.602 | 3.33 0.577 | 3.10 0.316 | 4.23 0.832 | 3.46 0.910 | 3.44 0.527 |
| IT17 | 3.40 0.894 | 3.67 0.707 | 4.24 0.903 | 4.82 0.405 | 4.67 0.658 | 4.67 0.577 | 4.50 0.707 | 4.77 0.599 | 3.96 0.948 | 4.67 0.500 |
| IT18 | 3.80 0.447 | 3.11 0.601 | 3.71 0.686 | 3.45 0.522 | 4.05 0.669 | 3.00 0.000 | 3.40 0.516 | 4.46 0.877 | 3.48 0.956 | 3.33 0.707 |
| IT19 | 2.20 0.447 | 2.67 0.500 | 3.18 0.529 | 3.00 0.447 | 3.19 0.680 | 2.33 0.577 | 2.70 0.675 | 3.23 0.599 | 3.28 1.037 | 2.89 0.601 |
| IT20 | 3.20 0.447 | 2.78 0.667 | 3.00 0.707 | 2.64 0.505 | 3.81 0.512 | 2.67 0.577 | 2.90 0.738 | 4.08 0.494 | 3.30 0.996 | 3.11 0.601 |
| IT21 | 2.80 0.447 | 2.67 0.707 | 2.82 0.636 | 2.82 0.405 | 3.38 0.498 | 2.67 0.577 | 2.70 0.675 | 3.92 0.277 | 3.33 0.995 | 3.00 0.500 |
| F4: Workforce (IT22 – IT27) | 3.10 0.091 | 2.81 0.615 | 3.28 0.372 | 2.85 0.369 | 3.42 0.417 | 3.06 0.096 | 3.05 0.377 | 4.17 0.403 | 3.57 0.770 | 3.15 0.358 |
| F4 Overall POINT Score | 3.46 (SD. 0.720) | | | | | | | | | |
| IT22 | 3.00 0.000 | 3.00 0.866 | 3.41 0.618 | 2.91 0.539 | 3.43 0.507 | 3.33 0.577 | 2.90 0.568 | 4.00 0.577 | 3.54 1.014 | 3.44 0.527 |
| IT23 | 3.00 0.000 | 2.56 0.527 | 2.88 0.485 | 2.64 0.505 | 3.14 0.359 | 2.67 0.577 | 2.50 0.527 | 3.62 0.506 | 3.26 1.059 | 2.44 0.726 |
| IT24 | 3.00 0.000 | 3.00 0.500 | 3.47 0.624 | 2.91 0.539 | 3.38 0.498 | 3.33 0.577 | 3.10 0.316 | 3.85 0.555 | 3.34 1.009 | 3.00 0.000 |
| IT25 | 3.00 0.000 | 2.44 0.726 | 3.47 0.514 | 2.55 0.522 | 3.52 0.602 | 3.00 0.000 | 3.10 0.316 | 4.31 0.751 | 3.75 0.864 | 3.33 0.500 |
| IT26 | 3.60 0.548 | 3.11 1.054 | 3.12 0.781 | 3.45 0.522 | 3.67 0.796 | 3.33 0.577 | 3.60 0.699 | 4.62 0.506 | 3.77 0.937 | 3.44 0.527 |
| IT27 | 3.00 0.000 | 2.78 0.667 | 3.35 0.493 | 2.64 0.505 | 3.38 0.590 | 2.67 0.577 | 3.10 0.316 | 4.62 0.650 | 3.77 0.864 | 3.22 0.441 |
| F5: Resources (IT28 – IT35) | 3.18 0.360 | 2.22 0.491 | 3.18 0.568 | 2.52 0.339 | 3.93 0.450 | 2.29 0.144 | 3.45 0.313 | 4.53 0.235 | 3.37 0.783 | 3.11 0.382 |
| F5 Overall POINT Score | 3.36 (SD. 0.792) | | | | | | | | | |
| IT28 | 3.40 0.894 | 2.00 0.707 | 2.82 0.883 | 1.82 0.603 | 3.86 0.655 | 2.00 0.000 | 3.00 0.471 | 4.54 0.660 | 3.28 1.029 | 2.78 0.667 |
| IT29 | 3.40 0.894 | 1.67 0.500 | 2.76 0.831 | 1.64 0.505 | 3.71 0.561 | 1.67 0.577 | 2.80 0.422 | 4.38 0.650 | 3.19 1.020 | 2.56 0.527 |
| IT30 | 3.20 0.447 | 2.11 0.601 | 2.88 1.111 | 2.82 0.405 | 4.24 0.625 | 3.00 0.000 | 3.50 0.527 | 4.62 0.870 | 3.17 1.173 | 3.44 0.527 |
| IT31 | 3.40 0.548 | 2.89 0.928 | 3.65 0.862 | 3.55 0.522 | 4.19 0.680 | 3.00 0.000 | 3.90 0.568 | 4.85 0.376 | 3.45 1.113 | 3.89 0.601 |
| IT32 | 3.80 0.447 | 2.56 0.726 | 3.35 0.862 | 2.73 0.467 | 4.10 0.700 | 2.67 0.577 | 3.80 0.422 | 4.77 0.439 | 3.49 1.078 | 3.56 0.726 |
| IT33 | 3.40 0.548 | 2.44 0.726 | 3.18 0.809 | 2.45 0.522 | 3.62 0.590 | 2.33 0.577 | 3.30 0.483 | 4.31 0.480 | 3.36 1.036 | 3.00 0.707 |
| IT34 | 2.00 0.000 | 1.89 0.333 | 3.41 0.618 | 2.45 0.522 | 3.95 0.498 | 2.00 0.000 | 3.60 0.516 | 4.54 0.519 | 3.35 1.060 | 2.56 0.527 |
| IT35 | 2.80 0.447 | 2.22 0.667 | 3.44 0.629 | 2.73 0.467 | 3.81 0.602 | 1.67 0.577 | 3.70 0.483 | 4.23 0.439 | 3.64 0.928 | 3.11 0.333 |
| F6: Management (IT36 – IT42) | 2.83 0.186 | 2.63 0.525 | 2.90 0.497 | 2.74 0.451 | 3.52 0.348 | 2.52 0.082 | 3.06 0.331 | 3.89 0.370 | 3.09 0.857 | 2.87 0.220 |
| F6 Overall POINT Score | 3.09 (SD. 0.776) | | | | | | | | | |
| IT36 | 2.40 0.548 | 2.33 0.707 | 2.94 0.899 | 2.82 0.405 | 3.43 0.598 | 2.00 0.000 | 3.00 0.471 | 3.77 0.599 | 3.20 0.997 | 2.89 0.333 |

| Factor | BN | CM | ID | LA | MS | MM | PH | SG | TH | VN |
|-------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| IT37 | 3.20 0.447 | 3.11 0.601 | 3.12 0.781 | 3.09 0.302 | 3.95 0.590 | 2.67 0.577 | 3.50 0.527 | 4.31 0.630 | 3.26 0.948 | 3.11 0.333 |
| IT38 | 2.60 0.548 | 2.44 0.527 | 3.00 0.500 | 2.82 0.751 | 3.38 0.498 | 3.00 0.000 | 2.90 0.316 | 3.77 0.439 | 3.09 1.067 | 2.78 0.441 |
| IT39 | 2.40 0.548 | 2.56 0.527 | 2.59 0.795 | 2.55 0.522 | 3.19 0.512 | 2.33 0.577 | 2.70 0.483 | 3.69 0.480 | 3.14 0.979 | 2.56 0.527 |
| IT40 | 3.00 0.000 | 2.67 0.707 | 2.76 0.437 | 2.64 0.674 | 3.33 0.483 | 3.00 0.000 | 3.10 0.316 | 3.69 0.480 | 2.90 1.051 | 3.00 0.500 |
| IT41 | 2.80 0.447 | 2.33 0.707 | 2.65 0.702 | 2.09 0.831 | 3.33 0.577 | 2.00 0.000 | 2.70 0.675 | 3.77 0.599 | 2.94 1.069 | 2.44 0.527 |
| IT42 | 3.40 0.548 | 3.00 0.866 | 3.24 0.752 | 3.18 0.603 | 4.00 0.548 | 2.67 0.577 | 3.50 0.850 | 4.23 0.832 | 3.07 1.000 | 3.33 0.500 |
| F7: Performance (IT43 – IT53) | 2.49 0.246 | 2.47 0.436 | 2.83 0.548 | 2.60 0.326 | 3.45 0.362 | 2.09 0.328 | 2.86 0.316 | 3.94 0.339 | 3.21 0.763 | 2.84 0.343 |
| F7 Overall POINT Score | 3.14 (SD. 0.733) | | | | | | | | | |
| IT43 | 2.80 1.095 | 2.67 0.866 | 3.06 0.827 | 2.91 0.539 | 3.76 0.436 | 2.33 1.155 | 3.30 0.483 | 4.15 0.555 | 3.25 1.019 | 3.11 0.333 |
| IT44 | 2.00 0.707 | 1.75 0.463 | 3.18 0.809 | 2.27 0.467 | 3.38 0.669 | 2.00 0.000 | 2.90 0.876 | 4.38 0.650 | 3.38 1.038 | 2.78 0.667 |
| IT45 | 3.00 0.000 | 2.56 0.726 | 3.18 0.728 | 3.09 0.302 | 3.67 0.483 | 2.33 0.577 | 3.10 0.316 | 4.31 0.480 | 3.59 0.861 | 3.22 0.441 |
| IT46 | 3.00 0.000 | 2.44 0.726 | 2.94 0.659 | 2.45 0.522 | 3.57 0.507 | 2.33 0.577 | 3.10 0.316 | 4.31 0.630 | 3.25 0.913 | 3.56 0.726 |
| IT47 | 1.40 0.548 | 1.22 0.441 | 2.29 0.985 | 1.09 0.302 | 2.57 0.598 | 1.00 0.000 | 1.60 0.699 | 4.00 0.408 | 2.72 1.016 | 2.00 0.707 |
| IT48 | 2.60 0.894 | 3.11 0.601 | 3.06 0.827 | 2.73 0.647 | 3.62 0.590 | 2.33 0.577 | 3.10 0.316 | 4.08 0.277 | 3.25 0.927 | 3.00 0.707 |
| IT49 | 2.20 0.447 | 2.33 0.500 | 2.53 0.717 | 2.27 0.467 | 3.10 0.641 | 2.00 0.000 | 2.40 0.516 | 3.69 0.480 | 3.18 0.984 | 2.00 0.500 |
| IT50 | 1.80 0.447 | 2.22 0.441 | 2.41 0.870 | 2.55 0.820 | 3.29 0.644 | 1.67 0.577 | 2.40 0.516 | 3.15 0.689 | 3.17 1.042 | 2.00 0.500 |
| IT51 | 2.60 0.548 | 2.89 0.601 | 2.88 0.332 | 2.91 0.539 | 3.71 0.561 | 2.33 0.577 | 3.00 0.000 | 3.85 0.555 | 3.15 0.896 | 2.89 0.333 |
| IT52 | 3.00 0.000 | 3.11 0.601 | 2.82 0.728 | 3.09 0.539 | 3.62 0.590 | 2.00 0.000 | 3.30 0.675 | 3.62 0.506 | 3.14 1.055 | 3.33 0.500 |
| IT53 | 3.00 0.000 | 2.89 0.782 | 2.82 0.728 | 3.18 0.405 | 3.71 0.561 | 2.67 0.577 | 3.30 0.675 | 3.77 0.439 | 3.28 0.948 | 3.33 0.500 |
| F8: Network (IT54 – IT59) | 3.10 0.641 | 2.93 0.607 | 3.54 0.576 | 3.50 0.325 | 3.89 0.451 | 2.89 0.096 | 3.50 0.444 | 4.72 0.258 | 3.39 0.834 | 3.50 0.417 |
| F8 Overall POINT Score | 3.48 (SD. 0.794) | | | | | | | | | |
| IT54 | 3.40 0.548 | 3.44 0.726 | 3.76 0.664 | 3.91 0.302 | 4.14 0.655 | 3.33 0.577 | 4.20 0.422 | 5.00 0.000 | 3.46 0.955 | 4.00 0.500 |
| IT55 | 3.20 0.837 | 3.33 0.707 | 3.82 0.728 | 4.00 0.447 | 4.10 0.625 | 3.33 0.577 | 4.10 0.568 | 5.00 0.000 | 3.44 1.003 | 3.89 0.601 |
| IT56 | 3.40 0.548 | 3.00 0.707 | 3.59 0.618 | 3.45 0.522 | 3.76 0.700 | 2.67 0.577 | 3.20 0.422 | 4.92 0.277 | 3.51 0.976 | 3.67 0.707 |
| IT57 | 2.80 0.837 | 2.67 0.707 | 3.29 0.772 | 3.36 0.674 | 3.71 0.644 | 3.00 0.000 | 3.20 0.632 | 4.69 0.480 | 3.28 0.931 | 3.11 0.333 |
| IT58 | 2.80 0.837 | 2.56 0.726 | 3.47 0.717 | 3.27 0.786 | 3.57 0.507 | 3.00 0.000 | 3.00 0.667 | 3.92 0.760 | 3.28 1.071 | 3.11 0.333 |

| Factor | BN | CM | ID | LA | MS | MM | PH | SG | TH | VN |
|-----------------------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| IT59 | 3.00 0.707 | 2.56 0.726 | 3.29 0.686 | 3.00 0.000 | 4.05 0.384 | 2.00 0.000 | 3.30 0.483 | 4.77 0.599 | 3.38 1.013 | 3.22 0.441 |
| Country Ave. POINT Score | 2.95 0.376 | 2.63 0.527 | 3.10 0.471 | 2.85 0.277 | 3.61 0.424 | 2.52 0.267 | 3.09 0.455 | 4.08 0.475 | 3.31 0.717 | 3.03 0.383 |
| Overall Ave. POINT Score | 3.12 (SD. 0.786) | | | | | | | | | |

The results of the country rankings of the average total POINT scores of the participating public organisations from Table 5.8 are as follows:

Tier 1:

1st rank is Singapore with total POINT score of 4.08

Tier 2:

2nd rank is Malaysia with total POINT score of 3.61

3rd rank is Thailand with total POINT score of 3.31

Tier 3:

4th rank is Indonesia with total POINT score of 3.10

5th rank is Philippines with total POINT score of 3.09

6th rank is Vietnam with total POINT score of 3.03

7th rank is Brunei Darussalam with total POINT score of 2.95

Tier 4:

8th ranks is Lao PDR with total POINT score of 2.83

9th rank is Cambodia with total POINT score of 2.63

10th rank is Myanmar with total POINT score of 2.52

The results of the average individual POINT factor scores also mostly followed the above ranking in the four Tiers except in some cases such as in F8: Networks & External Contexts OI where Indonesia with the factor score of 3.54, Lao PDR, Philippines, and Vietnam with the same average factor score of 3.50 respectively outperformed Thailand with the average factor score of 3.39. In F5: Resources OI,

Philippines in Tier 3 with the average score of 3.45 overtook Thailand in Tier 2 with the average score of 3.37.

In addition, the fact that the majority of the survey responses came from public organisations in Thailand also reflected in the higher SD. (Standard Deviation) values of the total and individual factor POINT scores of Thailand in comparison to other countries.

The overall ASEAN average POINT score was 3.12 which is in the middle range of 2.61 – 3.40 based on the same criteria of five-scale rating in Section 5.4 as previously discussed.

The results of the mean averages of each country and overall POINT scores in Table 5.8 were then used to develop the POINTinno.com online web-based application in Chapter 6.

5.6 Exploratory Factor Analysis (EFA) results

The purpose of EFA is to review the possible underlying factor structure of the proposed POINT measurement model when there is no constraint for each item to be specifically defined to be attached to each particular group among the eight POINT factors when the model undergoes computational simulation to solve the set of structural equations.

The EFA results indicated that the items in each POINT factor can be grouped to match the original proposed parent factor except for F2: Leadership and F3: Strategy factors that were found to have high cross-loadings. The strong linkages and high correlations between leadership and strategy innovativeness factors could be explained by the fact that leaders normally initiate and push forward the strategic plans and agendas to other organisational units to implement. In fact, for innovative organisation, top executives should develop clear views and final long-term aims than less significant short term objectives (Aragon-Correa et al, 2007).

Table 5.9: The EFA results of POINT Factors

| Item | EFA factor loading grouping | | | | | | | | EFA | POINT |
|------|-----------------------------|------|-------|------|-------|-------|-------|-------|-----|----------|
| | G1 | G2 | G3 | G4 | G5 | G6 | G7 | G8 | | |
| IT1 | .368 | .074 | .021 | .725 | .119 | -.011 | .119 | .148 | G4 | Culture |
| IT2 | .348 | .272 | .243 | .454 | .242 | -.067 | .214 | .176 | G4 | Culture |
| IT3 | .085 | .106 | .297 | .729 | .040 | .123 | .254 | -.110 | G4 | Culture |
| IT4 | .312 | .109 | .253 | .577 | .079 | .202 | .138 | -.038 | G4 | Culture |
| IT5 | .309 | .122 | .160 | .608 | .086 | .142 | .059 | .144 | G4 | Culture |
| IT6 | .282 | .245 | .208 | .672 | .166 | .214 | -.003 | .107 | G4 | Culture |
| IT7 | .335 | .111 | .228 | .443 | .078 | .380 | .006 | .197 | G4 | Culture |
| IT8 | .231 | .126 | .211 | .596 | .295 | .117 | .066 | .145 | G4 | Culture |
| IT9 | .585 | .100 | .206 | .428 | .096 | .171 | .189 | .197 | G4 | Culture |
| IT10 | .596 | .170 | .212 | .350 | .008 | .331 | .073 | .130 | G1 | Leader |
| IT11 | .502 | .336 | .250 | .142 | .182 | .164 | .078 | .153 | G1 | Leader |
| IT12 | .652 | .101 | .212 | .175 | -.058 | .180 | .212 | .055 | G1 | Leader |
| IT13 | .761 | .240 | .130 | .185 | .071 | .098 | .050 | .037 | G1 | Leader |
| IT14 | .673 | .343 | .196 | .224 | .137 | .130 | .082 | .219 | G1 | Leader |
| IT15 | .568 | .126 | .280 | .212 | .163 | .078 | .292 | .052 | G1 | Leader |
| IT16 | .560 | .297 | .114 | .300 | .114 | .028 | .247 | .094 | G1 | Strategy |
| IT17 | .474 | .292 | -.014 | .059 | .198 | .110 | .159 | .119 | G1 | Strategy |
| IT18 | .559 | .230 | .249 | .166 | .359 | .173 | .008 | .059 | G1 | Strategy |
| IT19 | .647 | .124 | .304 | .156 | .248 | .073 | .123 | .155 | G1 | Strategy |
| IT20 | .531 | .126 | .400 | .160 | .223 | .272 | .104 | .177 | G1 | Strategy |
| IT21 | .519 | .182 | .417 | .167 | .274 | .207 | .123 | .065 | G1 | Strategy |
| IT22 | .417 | .324 | .100 | .070 | .326 | .069 | .426 | -.034 | G7 | Workf |
| IT23 | .194 | .121 | .350 | .283 | .296 | .116 | .582 | .047 | G7 | Workf |
| IT24 | .173 | .335 | .097 | .218 | .204 | .081 | .668 | -.015 | G7 | Workf |
| IT25 | .325 | .277 | -.038 | .168 | .229 | .065 | .642 | .046 | G7 | Workf |
| IT26 | .336 | .110 | .251 | .208 | .126 | .209 | .491 | .191 | G7 | Workf |
| IT27 | .278 | .327 | .132 | .320 | .110 | .040 | .652 | .170 | G7 | Workf |
| IT28 | .314 | .375 | .078 | .133 | .689 | .139 | .178 | .140 | G5 | Resouc |
| IT29 | .263 | .400 | .104 | .140 | .592 | .102 | .182 | .316 | G5 | Resouc |
| IT30 | .107 | .323 | .063 | .117 | .577 | .113 | -.012 | .389 | G5 | Resouc |
| IT31 | .084 | .267 | .065 | .120 | .677 | .070 | .160 | .356 | G5 | Resouc |
| IT32 | .301 | .226 | .217 | .178 | .599 | .053 | .079 | .248 | G5 | Resouc |
| IT33 | .268 | .182 | .305 | .109 | .643 | .198 | .194 | .219 | G5 | Resouc |
| IT34 | .072 | .410 | .367 | .163 | .570 | .076 | .101 | .091 | G5 | Resouc |
| IT35 | .209 | .299 | .395 | .130 | .616 | .116 | .210 | -.010 | G5 | Resouc |
| IT36 | .231 | .090 | .417 | .168 | .216 | .439 | .120 | .101 | G6 | Mangm |
| IT37 | .329 | .164 | .245 | .331 | .249 | .455 | .102 | -.002 | G6 | Mangm |
| IT38 | .358 | .295 | .235 | .333 | .262 | .470 | .211 | .122 | G6 | Mangm |
| IT39 | .454 | .225 | .334 | .300 | .094 | .475 | .090 | .230 | G6 | Mangm |
| IT40 | .462 | .356 | .294 | .250 | .221 | .470 | .177 | -.066 | G6 | Mangm |

| Item | EFA factor loading grouping | | | | | | | | EFA | POINT | |
|---|-----------------------------|------|------|------|-------|-------|-------|-------|----------|---------|-------|
| | G1 | G2 | G3 | G4 | G5 | G6 | G7 | G8 | | | |
| IT41 | .430 | .209 | .416 | .102 | .091 | .555 | .214 | .062 | G6 | Mangm | |
| IT42 | .382 | .271 | .271 | .318 | .136 | .619 | -.021 | .179 | G6 | Mangm | |
| IT43 | .325 | .341 | .521 | .220 | .169 | .079 | .176 | .033 | G3 | Perform | |
| IT44 | .084 | .349 | .501 | .079 | .216 | .079 | .478 | .141 | G3 | Perform | |
| IT45 | .117 | .364 | .553 | .279 | .142 | .163 | .265 | .207 | G3 | Perform | |
| IT46 | .169 | .412 | .526 | .259 | .184 | .139 | .231 | .141 | G3 | Perform | |
| IT47 | .278 | .363 | .556 | .156 | .236 | .243 | .115 | .094 | G3 | Perform | |
| IT48 | .204 | .292 | .557 | .155 | .124 | .180 | .197 | .078 | G3 | Perform | |
| IT49 | .371 | .286 | .592 | .192 | .183 | .256 | .184 | .059 | G3 | Perform | |
| IT50 | .230 | .200 | .743 | .110 | .201 | .039 | -.001 | .108 | G3 | Perform | |
| IT51 | .374 | .384 | .621 | .229 | .150 | .135 | -.035 | .074 | G3 | Perform | |
| IT52 | .239 | .177 | .738 | .228 | .069 | .088 | -.007 | -.132 | G3 | Perform | |
| IT53 | .303 | .344 | .606 | .241 | .074 | .054 | -.035 | -.014 | G3 | Perform | |
| IT54 | .142 | .804 | .244 | .138 | .201 | .200 | .060 | -.032 | G2 | Network | |
| IT55 | .222 | .803 | .284 | .090 | .186 | .048 | .046 | -.148 | G2 | Network | |
| IT56 | .198 | .719 | .247 | .083 | .087 | .120 | .236 | -.068 | G2 | Network | |
| IT57 | .197 | .775 | .211 | .078 | .135 | .148 | .139 | .139 | G2 | Network | |
| IT58 | .254 | .665 | .211 | .100 | -.008 | -.028 | .170 | .245 | G2 | Network | |
| IT59 | .187 | .743 | .114 | .139 | -.019 | .111 | .036 | .253 | G2 | Network | |
| Extraction Methods: Principal Axis Factoring | | | | | | | | | | | |
| Rotation Method: Verimax with Kaiser Normalization | | | | | | | | | | | |
| Kaiser – Meyer – Olkin Measure of Sampling Adequacy | | | | | | | | | .917 | | |
| Approx. Chi-Square | | | | | | | | | 9235.851 | | |
| Bartlett's Test of Sphericity | | | | df | | | | 1711 | | | |
| | | | | | | | | | Sig. | | .000* |

The results of EFA of POINT factors in Table 5.9 show that all the items in each POINT factors can be randomly grouped to match its original factor grouping, except F2: Leadership and F3: Strategy that the EFA results put them into the same group due to high cross-factor loadings. Therefore, we have the choice to group them together into the same factor or keep them separate as in the original model. The researcher decided to keep them separate as this point to further test the fit of the proposed POINT measurement model with CFA.

KMO & Bartlett's Test of Sphericity is a measure of sampling adequacy that is recommended to check the case to variable ratio for the analysis being conducted. In Factor Analysis, KMO & Bartlett's test play an important role for accepting the sample adequacy. While the KMO ranges from 0 to 1, the accepted index is over 0.6. The Bartlett's Test of Sphericity relates to the significance of the study and thereby shows the validity and suitability of the responses collected to the problem being addressed through the study. For Factor Analysis to be recommended suitable, the Bartlett's Test of Sphericity must be less than 0.05 (online source: <http://badmforum.blogspot.com/2012/08/factor-analysis-kmo-bartletts-test.html>).

Therefore, the KMO value of 0.917 and Bartlett's Test of Sphericity Sig. value .000 indicated that that the sampling is adequate and suitable for factor analysis.

5.7 Confirmatory Factor Analysis (CFA) of POINT model

Results of the CFA of the eight factors of POINT are discussed in this section.

5.7.1 Verification of F1: Culture innovativeness

First-order CFA results between the latent variables (IT01 – IT09) of F1: Culture innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square (χ^2 (22, N = 290) = 32.153, p = .075) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 0.994, Tucker-Lewis Index (TLI) of 0.990, root mean square error of approximation (RMSEA) of .040, and standardized root mean squared residual (SRMR) of .018. The CFA validation of the measurement model is shown in Figure 5.1

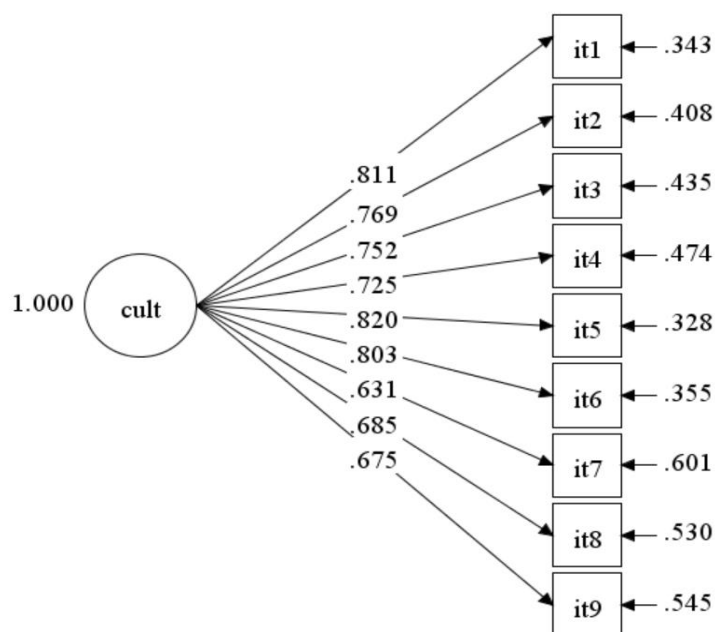


Figure 5.1: CFA model validation of F1: Culture innovativeness

$$\chi^2 (22, N = 290) = 32.153, p = .075, CFI = .994,$$

$$TLI = .990, RMSEA = .040, SRMR = .018$$

Table 5.10: Correlations among the observed indicators of F1: Culture

| | IT01 | IT02 | IT03 | IT04 | IT05 | IT06 | IT07 | IT08 | IT09 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| IT01 | 1.00 | | | | | | | | |
| IT02 | .66** | 1.00 | | | | | | | |
| IT03 | .60** | .67** | 1.00 | | | | | | |
| IT04 | .58** | .43** | .57** | 1.00 | | | | | |
| IT05 | .67** | .63** | .61** | .58** | 1.00 | | | | |
| IT06 | .63** | .60** | .58** | .60** | .68** | 1.00 | | | |
| IT07 | .55** | .43** | .51** | .45** | .49** | .53** | 1.00 | | |
| IT08 | .55** | .54** | .53** | .46** | .57** | .55** | .66** | 1.00 | |
| IT09 | .51** | .52** | .55** | .51** | .54** | .56** | .60** | .69** | 1.00 |
| Mean | 3.50 | 3.54 | 3.18 | 3.32 | 3.38 | 2.84 | 2.74 | 2.93 | 3.00 |
| SD | .91 | .89 | .95 | .98 | .94 | .93 | .98 | .95 | .94 |

The factor loadings among all the indicators in F1: Culture factor as shown in Table 5.10 were significant ($p < .01$) with the correlation values from .43 to .69 indicating

that these 9 observed variables can be used as the indicators for measuring F1: Culture innovativeness.

Table 5.11: The first-order CFA results of F1: Culture innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT01 | .811 | - | .657 | .155 |
| IT02 | .769 | .000 | .592 | .153 |
| IT03 | .752 | .000 | .565 | .078 |
| IT04 | .725 | .000 | .526 | .131 |
| IT05 | .820 | .000 | .672 | .158 |
| IT06 | .803 | .000 | .645 | .144 |
| IT07 | .631 | .000 | .399 | .033 |
| IT08 | .685 | .000 | .470 | .045 |
| IT09 | .675 | .000 | .455 | .047 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.11. The factor loading values were from .646 to .860 which prove that the proposed indicators can be the good representatives to measure F1: Culture innovativeness factor.

5.7.2 Verification of F2: Leadership innovativeness

First-order CFA results between the latent variables (IT10 – IT15) of F2: Leadership innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square ($\chi^2(6, N = 290) = 2.431, p = .876$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 1.000, Tucker-Lewis Index (TLI) of 1.000, root mean square error of approximation (RMSEA) of .000, and standardized root mean squared residual (SRMR) of .007. The CFA validation of the measurement model is shown in Figure 5.2

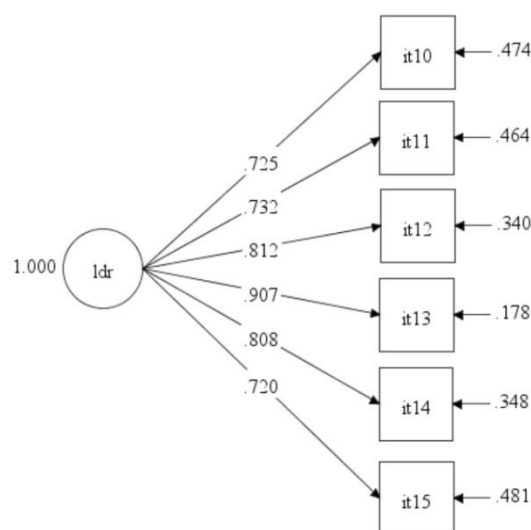


Figure 5.2: CFA model validation results of F2: Leadership innovativeness

$$\chi^2 (6, N = 290) = 2.431, p = .876, CFI = 1.000,$$

$$TLI = 1.000, RMSEA = .000, SRMR = .007$$

The factor loadings among all the indicators in F2: Leadership factor as shown in Table 5.12 were significant ($p < .01$) with the correlation values from .42 to .74 indicating that these 6 observed variables can be used as the indicators for measuring leadership innovativeness.

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Table 5.12: Correlation among the observed variables of F2: Leadership

| | IT10 | IT11 | IT12 | IT13 | IT14 | IT15 |
|------|-------|-------|-------|-------|-------|------|
| IT10 | 1.00 | | | | | |
| IT11 | .42** | 1.00 | | | | |
| IT12 | .57** | .61** | 1.00 | | | |
| IT13 | .61** | .67** | .74** | 1.00 | | |
| IT14 | .61** | .58** | .66** | .73** | 1.00 | |
| IT15 | .60** | .52** | .59** | .66** | .58** | 1.00 |
| M | 3.35 | 3.03 | 3.09 | 3.20 | 3.21 | 3.60 |
| SD | 0.97 | 1.11 | 0.92 | 0.97 | 0.94 | 0.88 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.13. The factor loading values were from .720 to .907 which prove that the proposed indicators can be the good representatives to measure F2: Leadership innovativeness factor.

Table 5.13: The first-order CFA results of F2: Leadership innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT10 | .725 | - | .526 | .124 |
| IT11 | .732 | .000 | .536 | .097 |
| IT12 | .812 | .000 | .660 | .129 |
| IT13 | .907 | .000 | .822 | .297 |
| IT14 | .808 | .000 | .652 | .123 |
| IT15 | .720 | .000 | .519 | .062 |

5.7.3 Verification of F3: Strategy Innovativeness

First-order CFA results between the latent variables (IT16 – IT21) of F3: Strategy innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square ($\chi^2(7, N = 290) = 7.400, p = .389$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 1.000, Tucker-Lewis Index (TLI) of 0.999, root mean square error of approximation (RMSEA) of .014, and standardized root mean squared residual (SRMR) of .012. The CFA validation of the measurement model is shown in Figure 5.3

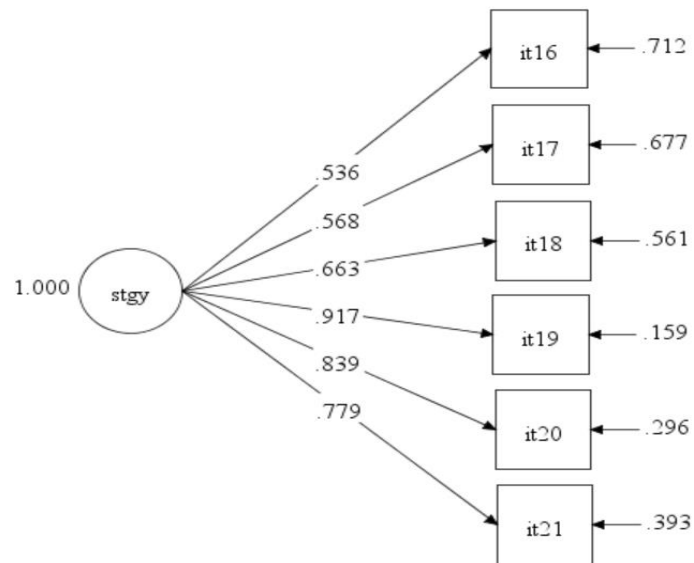


Figure 5.3: CFA model validation results of F3: Strategy innovativeness

$$\chi^2 (7, N = 290) = 7.400, p = .389, CFI = 1.000,$$

$$TLI = .999, RMSEA = .014, SRMR = .012$$

Table 5.14: Correlation among the observed variables of F3: Strategy

| | IT16 | IT17 | IT18 | IT19 | IT20 | IT21 |
|------|-------|-------|-------|-------|-------|------|
| IT16 | 1.00 | | | | | |
| IT17 | .39** | 1.00 | | | | |
| IT18 | .35** | .61** | 1.00 | | | |
| IT19 | .49** | .54** | .61** | 1.00 | | |
| IT20 | .43** | .48** | .62** | .77** | 1.00 | |
| IT21 | .42** | .40** | .51** | .59** | .67** | 1.00 |
| M | 3.80 | 3.83 | 3.29 | 3.28 | 3.22 | 3.34 |
| SD | 1.00 | 0.90 | 0.90 | 0.95 | 0.92 | 0.90 |

The factor loadings among all the indicators in F3: Strategy factor as shown in Table 5.14 were significant ($p < .01$) with the correlation values from .35 to .77 indicating that these 6 observed variables can be used as the indicators for measuring strategy innovativeness.

Table 5.15: The first-order CFA results of F3: Strategy innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT16 | .536 | - | .288 | .023 |
| IT17 | .568 | .000 | .323 | .022 |
| IT18 | .663 | .000 | .439 | .020 |
| IT19 | .917 | .000 | .841 | .321 |
| IT20 | .839 | .000 | .704 | .091 |
| IT21 | .779 | .000 | .607 | .177 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.15. The factor loading values were from .536 to .917 which prove that the proposed indicators can be the good representatives to measure F3: Strategy innovativeness factor.

5.7.4 Verification of F4: Workforce innovativeness

First-order CFA results between the latent variables (IT22 – IT27) of F4: Workforce innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square ($\chi^2(3, N = 290) = 920.784, p = .526$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 1.000, Tucker-Lewis Index (TLI) of 1.000, root mean square error of approximation (RMSEA) of .000, and standardized root mean squared residual (SRMR) of .009. The CFA validation of the measurement model is shown in Figure 5.4

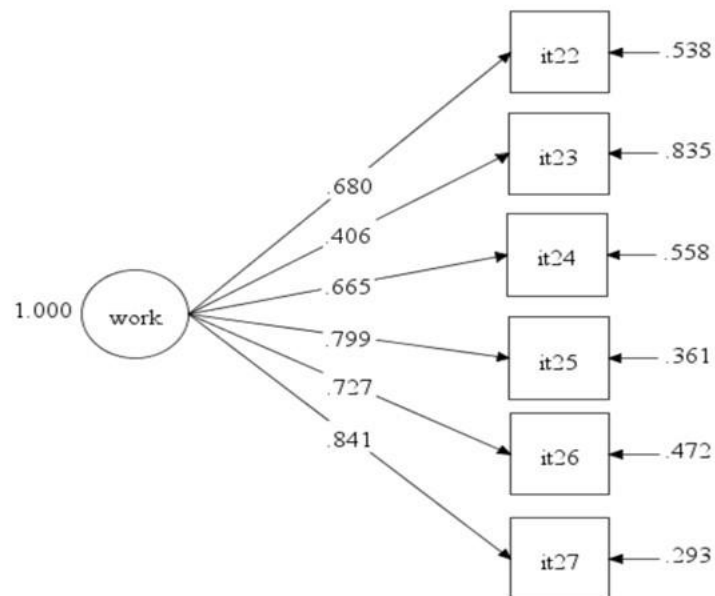


Figure 5.4: CFA model validation results of F4: Workforce innovativeness

$\chi^2 (3, N = 290) = 920.784, p = .526, CFI = 1.000,$

$TLI = 1.000, RMSEA = .000, SRMR = .009$

Table 5.16: Correlation among the observed variables of F4: Workforce

| | IT22 | IT23 | IT24 | IT25 | IT26 | IT27 |
|------|-------|-------|-------|-------|-------|-------|
| IT22 | 1.00 | | | | | |
| IT23 | .66** | 1.00 | | | | |
| IT24 | .56** | .68** | 1.00 | | | |
| IT25 | .55** | .46** | .55** | 1.00 | | |
| IT26 | .47** | .49** | .56** | .59** | 1.00 | |
| IT27 | .58** | .43** | .55** | .66** | .62** | 1.00 |
| M | 3.30 | 3.28 | 3.33 | 3.68 | 3.61 | 3.52 |
| SD | .950 | .919 | .931 | .870 | .886 | 1.019 |

The factor loadings among all the indicators in F4: Workforce factor as shown in Table 5.16 were significant ($p < .01$) with the correlation values from .43 to .68 indicating that these 6 observed variables can be used as the indicators for measuring workforce innovativeness.

Table 5.17: The first-order CFA results of F4: Workforce innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT22 | .680 | - | .462 | .216 |
| IT23 | .406 | .000 | .165 | -.272 |
| IT24 | .665 | .000 | .442 | .191 |
| IT25 | .799 | .000 | .639 | .222 |
| IT26 | .727 | .000 | .528 | .170 |
| IT27 | .841 | .000 | .707 | .207 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.17. The factor loading values were from .406 to .841 which prove that the proposed indicators can be the good representatives to measure F4: Workforce innovativeness factor.

5.7.5 Verification of F5: Resources innovativeness

First-order CFA results between the latent variables (IT28 – IT35) of F5: Resources innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square (χ^2 (8, N = 290) = 8.358, $p = .399$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 1.000, Tucker-Lewis Index (TLI) of .999, root mean square error of approximation (RMSEA) of .012, and standardized root mean squared residual (SRMR) of .015. The CFA validation of the measurement model is shown in Figure 5.5

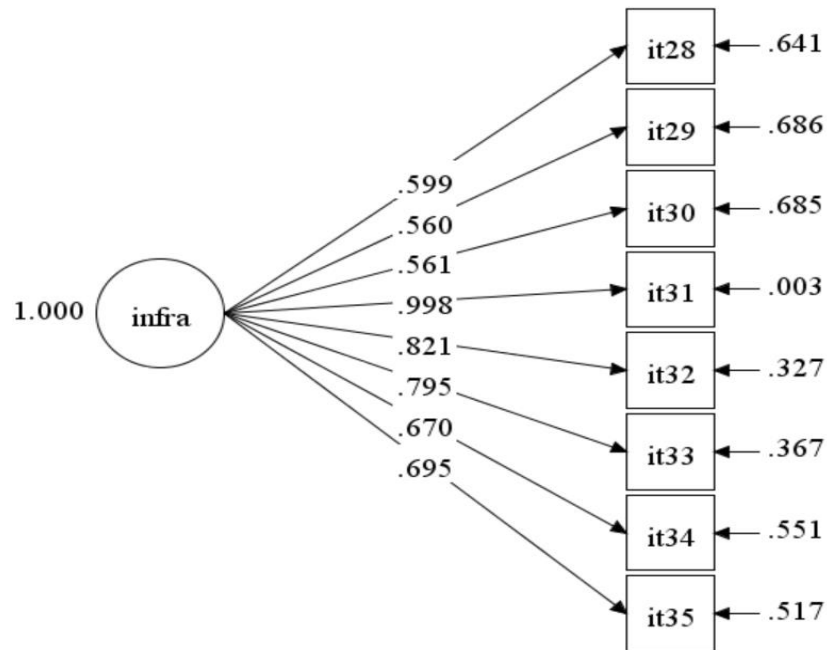


Figure 5.5: CFA model validation results of F5: Resources innovativeness

$\chi^2 (8, N = 290) = 8.358, p = .399, CFI = 1.000,$

$TLI = .999, RMSEA = .012, SRMR = .015$

**Table 5.18: Correlations among the observed variables
of F5: Resources Innovativeness**

| | IT28 | IT29 | IT30 | IT31 | IT32 | IT33 | IT34 | IT35 |
|------|-------|-------|-------|-------|-------|-------|-------|------|
| IT28 | 1.00 | | | | | | | |
| IT29 | .75** | 1.00 | | | | | | |
| IT30 | .51** | .63** | 1.00 | | | | | |
| IT31 | .60** | .57** | .70** | 1.00 | | | | |
| IT32 | .54** | .47** | .47** | .52** | 1.00 | | | |
| IT33 | .46** | .41** | .42** | .39** | .65** | 1.00 | | |
| IT34 | .36** | .37** | .49** | .42** | .55** | .64** | 1.00 | |
| IT35 | .40** | .38** | .28** | .34** | .55** | .58** | .60** | 1.00 |
| M | 3.17 | 3.25 | 3.42 | 3.51 | 3.41 | 3.33 | 3.34 | 3.41 |
| SD | 1.059 | 1.052 | 1.105 | 1.060 | 1.019 | 1.005 | .973 | .949 |

The factor loadings among all the indicators in F5: Resources innovativeness as shown in Table 5.18 were significant ($p < .01$) with the correlation values from .28 to

.75 indicating that these 8 observed variables can be used as the indicators for measuring F5: Resources innovativeness.

Table 5.19: The first-order CFA results of F5: Resources Innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT28 | .599 | - | .359 | .139 |
| IT29 | .560 | .000 | .314 | .040 |
| IT30 | .561 | .000 | .315 | .258 |
| IT31 | .998 | .000 | .997 | .450 |
| IT32 | .821 | .000 | .656 | .364 |
| IT33 | .795 | .000 | .633 | .249 |
| IT34 | .670 | .000 | .449 | .018 |
| IT35 | .695 | .000 | .483 | .113 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.19. The factor loading values were from .560 to .998 which prove that the proposed indicators can be the good representatives to measure F5: Resources innovativeness factor.

5.7.6 Verification of F6: Management innovativeness

First-order CFA results between the latent variables (IT36 – IT42) of F6: Management innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square (χ^2 (7, N = 290) = 7.400, p = .389) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 1.000, Tucker-Lewis Index (TLI) of .999, root mean square error of approximation (RMSEA) of .014, and standardized root mean

squared residual (SRMR) of .012. The CFA validation of the measurement model is shown in Figure 5.6

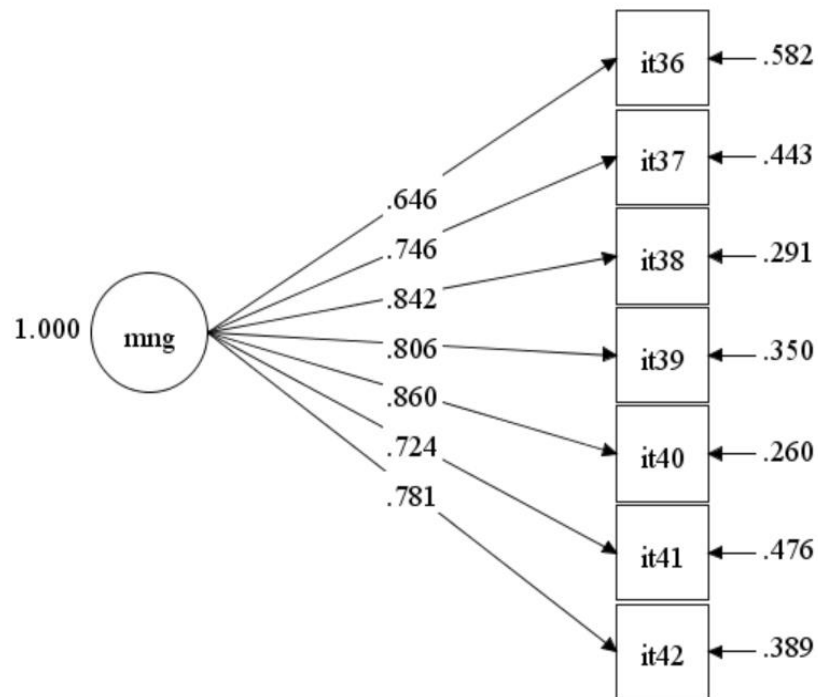


Figure 5.6: CFA Model Validation Results of F6: Management innovativeness

$$\chi^2 (7, N = 290) = 7.400, p = .389, CFI = 1.000,$$

$$TLI = .999, RMSEA = .014, SRMR = .012$$

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Table 5.20: Correlation among the Observed Variables of F6: Management

| | IT36 | IT37 | IT38 | IT39 | IT40 | IT41 | IT42 |
|------|-------|-------|-------|-------|-------|-------|------|
| IT36 | 1.00 | | | | | | |
| IT37 | .57** | 1.00 | | | | | |
| IT38 | .55** | .64** | 1.00 | | | | |
| IT39 | .49** | .58** | .69** | 1.00 | | | |
| IT40 | .54** | .57** | .71** | .72** | 1.00 | | |
| IT41 | .63** | .55** | .60** | .64** | .72** | 1.00 | |
| IT42 | .54** | .58** | .57** | .61** | .68** | .73** | 1.00 |
| M | 3.28 | 3.22 | 2.99 | 3.10 | 2.88 | 3.13 | 3.15 |
| SD | .92 | .86 | .96 | .88 | .98 | 1.04 | .95 |

The factor loadings among all the indicators in F6: Management innovativeness as shown in Table 5.20 were significant ($p < .01$) with the correlation values from .49 to .71 indicating that these 7 observed variables can be used as the indicators for measuring F6: Management innovativeness.

Table 5.21: The first-order CFA results of F6: Management innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT36 | .646 | - | .418 | .053 |
| IT37 | .746 | .000 | .557 | .107 |
| IT38 | .842 | .000 | .709 | .171 |
| IT39 | .806 | .000 | .650 | .120 |
| IT40 | .860 | .000 | .740 | .186 |
| IT41 | .724 | .000 | .524 | .049 |
| IT42 | .781 | .000 | .611 | .148 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.21. The factor loading values were from .646 to .860 which prove that the proposed indicators can be the good representatives to measure F6: Management innovativeness factor.

5.7.7 Verification of F7: Performance innovativeness

First-order CFA results between the latent variables (IT43 – IT53) of F7: Performance innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square ($\chi^2 (24, N = 290) = 35.030, p = .068$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of .995, Tucker-Lewis Index (TLI) of .988, root mean square error of approximation (RMSEA) of .040, and standardized root mean

squared residual (SRMR) of .026. The CFA validation of the measurement model is shown in Figure 5.7

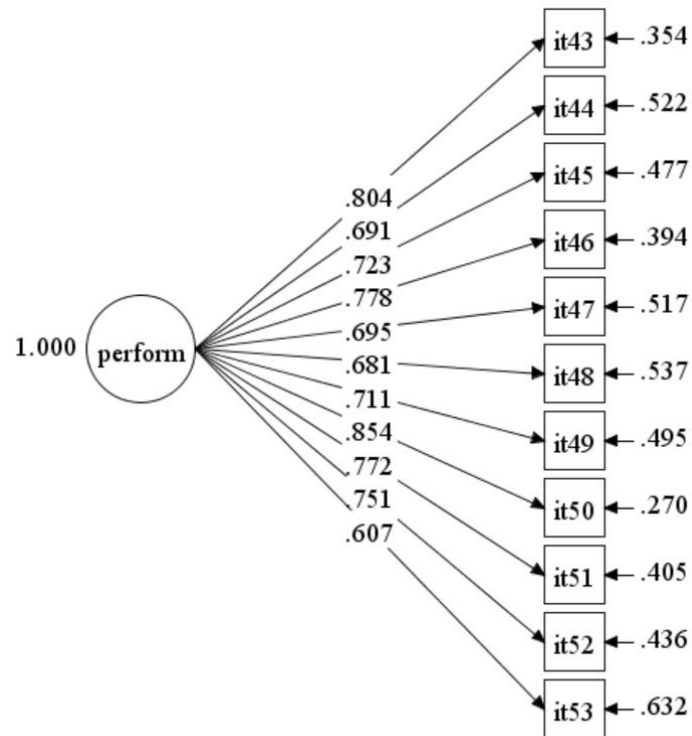


Figure 5.7: CFA model validation results of F7: Performance innovativeness

$$\chi^2 (24, N = 290) = 35.030, p = .068, CFI = .995,$$

$$TLI = .988, RMSEA = .040, SRMR = .026$$

Table 5.22: Correlation among the observed variables of F7: Performance

| | IT43 | IT44 | IT45 | IT46 | IT47 | IT48 | IT49 | IT50 | IT51 | IT52 | IT53 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| IT43 | 1.00 | | | | | | | | | | |
| IT44 | .62** | 1.00 | | | | | | | | | |
| IT45 | .61** | .63** | 1.00 | | | | | | | | |
| IT46 | .61** | .56** | .69** | 1.00 | | | | | | | |
| IT47 | .56** | .61** | .49** | .45** | 1.00 | | | | | | |
| IT48 | .54** | .55** | .55** | .63** | .47** | 1.00 | | | | | |
| IT49 | .55** | .49** | .57** | .60** | .48** | .68** | 1.00 | | | | |
| IT50 | .51** | .56** | .61** | .51** | .57** | .58** | .61** | 1.00 | | | |
| IT51 | .49** | .49** | .53** | .44** | .57** | .50** | .60** | .67** | 1.00 | | |
| IT52 | .45** | .47** | .50** | .37** | .56** | .50** | .51** | .66** | .72** | 1.00 | |
| IT53 | .49** | .45** | .42** | .20** | .55** | .34** | .34** | .54** | .56** | .71** | 1.00 |
| M | 3.16 | 3.37 | 3.43 | 2.85 | 2.92 | 3.05 | 2.96 | 3.18 | 3.17 | 3.20 | 3.56 |
| SD | 1.03 | 0.94 | 0.87 | 1.11 | 0.97 | 0.93 | 0.97 | 0.92 | 0.86 | 0.93 | 0.94 |

The factor loadings among all the indicators in F7: Performance innovativeness as shown in Table 5.22 were significant ($p < .01$) with the correlation values from .20 to .71 indicating that these 11 observed variables can be used as the indicators for measuring F7: Performance innovativeness.

Table 5.23: The first-order CFA results of F7: Performance innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT43 | .804 | - | .646 | .250 |
| IT44 | .691 | .000 | .478 | .010 |
| IT45 | .723 | .000 | .523 | -.073 |
| IT46 | .778 | .000 | .606 | .234 |
| IT47 | .695 | .000 | .483 | .035 |
| IT48 | .681 | .000 | .463 | -.034 |
| IT49 | .711 | .000 | .505 | -.003 |
| IT50 | .854 | .000 | .730 | .323 |
| IT51 | .772 | .000 | .595 | .126 |
| IT52 | .751 | .000 | .564 | .176 |
| IT53 | .607 | .000 | .368 | .001 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.23. The factor loading values were from .607 to .854 which prove that the proposed indicators can be the good representatives to measure F7: Performance innovativeness factor.

5.7.8 Verification of F8: Networks & External contexts innovativeness

First-order CFA results between the latent variables (IT54 – IT59) of F8: Networks & external contexts innovativeness revealed that the proposed measurement model fitted with the empirical data considering the chi-square ($\chi^2 (4, N = 290) = 1.645$, $p = .801$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data. Assessment of the fit indices also showed

that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 1.000, Tucker-Lewis Index (TLI) of 1.000, root mean square error of approximation (RMSEA) of .040, and standardized root mean squared residual (SRMR) of .006. The CFA validation of the measurement model is shown in Figure 5.8

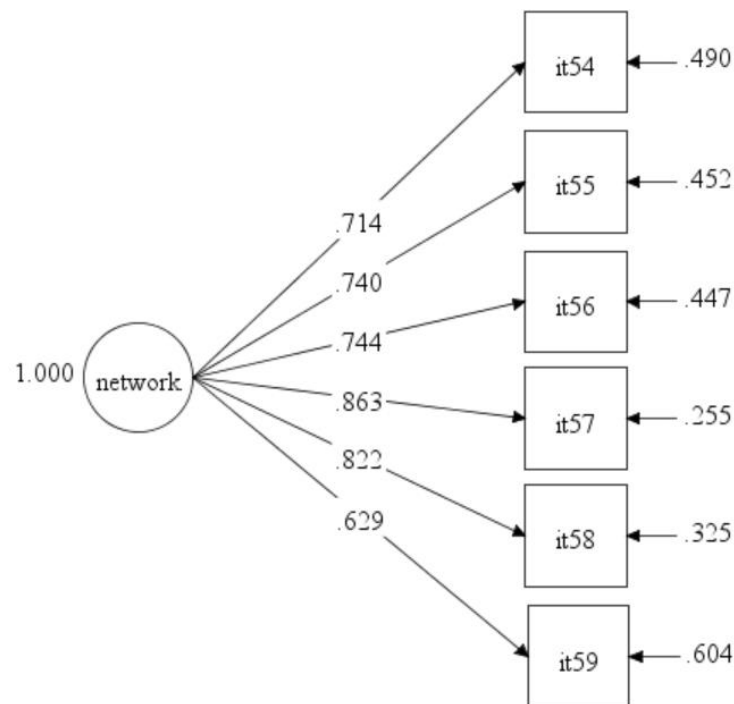


Figure 5.8: CFA Model Validation Results of F8: Networks innovativeness

$$\chi^2 (4, N = 290) = 1.645, p = .801, CFI = 1.000,$$

$$TLI = 1.000, RMSEA = .040, SRMR = .006$$

Table 5.24: Correlation among the observed variables of F8: Networks

| | IT54 | IT55 | IT56 | IT57 | IT58 | IT59 |
|------|-------|-------|-------|-------|-------|------|
| IT54 | 1.00 | | | | | |
| IT55 | .39** | 1.00 | | | | |
| IT56 | .35** | .61** | 1.00 | | | |
| IT57 | .49** | .54** | .61** | 1.00 | | |
| IT58 | .43** | .48** | .62** | .77** | 1.00 | |
| IT59 | .42** | .40** | .51** | .59** | .67** | 1.00 |
| M | 3.80 | 3.83 | 3.29 | 3.28 | 3.22 | 3.34 |
| SD | 1.00 | 0.90 | 0.90 | 0.95 | 0.92 | 0.90 |

The factor loadings among all the indicators in F8: Networks innovativeness as shown in Table 5.24 were significant ($p < .01$) with the correlation values from .35 to .77 indicating that these 6 observed variables can be used as the indicators for measuring F8: Networks innovativeness.

Table 5.25: The first-order CFA Results of F8: Networks innovativeness

| Indicators | Factor Loading (β) | t | R^2 | Factor Score |
|------------|----------------------------|------|-------|--------------|
| IT54 | .714 | - | .510 | .054 |
| IT55 | .740 | .000 | .548 | .054 |
| IT56 | .744 | .000 | .553 | .076 |
| IT57 | .863 | .000 | .745 | .104 |
| IT58 | .822 | .000 | .675 | .308 |
| IT59 | .629 | .000 | .396 | .188 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) are shown in Table 5.25. The factor loading values were from .629 to .863 which prove that the proposed indicators can be the good representatives to measure F8: Networks innovativeness factor.

5.7.9 Verification of the eight factors representing the overall POINT scores via first order CFA

First-order CFA results of the eight factors representing the overall POINT scores in the proposed measurement model revealed that the proposed variables fitted with the empirical data considering the chi-square ($\chi^2(14, N = 290) = 20.024, p = .129$) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the empirical data.

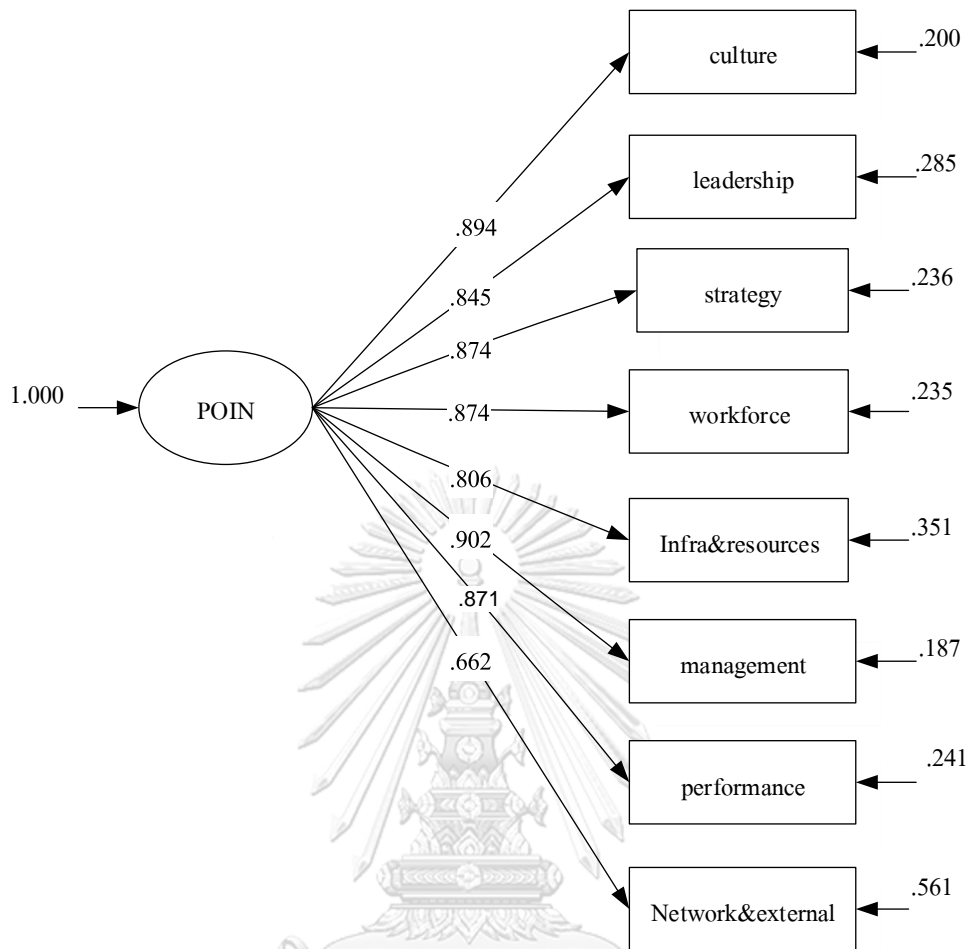


Figure 5.9: CFA model validation of POIN factor F1-F8

$\chi^2 (14, N = 290) = 20.024, p = .129, CFI = .997,$

$TLI = .995, RMSEA = .039, SRMR = .011$

Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of .997, Tucker-Lewis Index (TLI) of .995, root mean square error of approximation (RMSEA) of .039, and standardized root mean squared residual (SRMR) of .011. The CFA results of the eight factors representing the overall POINT scores is shown in Figure 5.9

Table 5.26: Correlation among the Observed Variables of POINT

| | POIN1 | POIN2 | POIN3 | POIN4 | POIN5 | POIN6 | POIN7 | POIN8 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Culture | 1.00 | | | | | | | |
| Leadership | .80** | 1.00 | | | | | | |
| Strategy | .79** | .82** | 1.00 | | | | | |
| Workforce | .78** | .75** | .77** | 1.00 | | | | |
| Resources | .69** | .63** | .71** | .73** | 1.00 | | | |
| Management | .82** | .76** | .79** | .77** | .71** | 1.00 | | |
| Performance | .78** | .73** | .74** | .75** | .73** | .80** | 1.00 | |
| Networks | .57** | .56** | .63** | .57** | .73** | .60** | .68** | 1.00 |
| M | 3.16 | 3.25 | 3.46 | 3.46 | 3.35 | 3.11 | 3.17 | 3.48 |
| SD | 0.74 | 0.79 | 0.72 | 0.74 | 0.77 | 0.77 | 0.72 | 0.76 |

The factor loadings among all the eight factors and the corresponding POINT factor scores as shown in Table 5.26 were significant ($p < .01$) with the correlation values from .56 to .82 indicating that the proposed 8 observed variables can be used as the indicators to measure the corresponding POINT factor scores.

Table 5.27: The first-order CFA results of the overall POINT scores

| Indicators | 1 st Order Factor Loading (β) | t | R^2 | Factor Score |
|-----------------|--|-------|-------|--------------|
| F1: Culture | .894 | - | .800 | .165 |
| F2: Leadership | .845 | .000* | .715 | .074 |
| F3: Strategy | .874 | .000* | .764 | .135 |
| F4: Workforce | .874 | .000* | .765 | .150 |
| F5: Resources | .806 | .000* | .649 | .117 |
| F6: Management | .902 | .000* | .813 | .187 |
| F7: Performance | .871 | .000* | .759 | .164 |
| F8: Network | .662 | .000* | .439 | -.034 |

The results of the standardized factor loadings (β), percentage of variances (R^2), and factor score coefficients (FS) of the overall POINT scores are shown in Table 5.27. The factor loading values were from 0.662 in F8: Network innovativeness to 0.902 in F6: Management innovativeness which prove that the proposed eight factors can be the good representatives to measure the overall POINT scores.

Factor loadings represent the correlation of each factor on the observed variables. Factor scores represent the weights of each observed variables in producing a score representing the factor. The resulting factor scores from CFA computational methods were calculated with mean = 0 and SD = 1.0 and were subsequently used and converted into the corresponding weighted sum percentages in the development of POINTinno.com application.

5.7.10 Second-order CFA to validation of POINT measurement model

The purpose of the second-order CFA analysis is to validate the assumption that the overall organisational innovativeness can be represented by the proposed eight factors of POINT model. Standardized first-order loadings in the Sections 5.7.1 to 5.7.9 are the standard regression weights of the individual variable's loadings loaded separately onto the component factors, whereas standardized second-order loadings are the standard regression weights of the first-order factors in the POINT model loaded simultaneously onto the overall POINT scores. Factor loadings in second-order CFA are based on covariance matrix and regression coefficients and do not need to equal to correlation coefficients.

The results of 2nd order CFA model fitting are shown in Figure 5.10. The goodness of fit indices revealed that the proposed variables fitted with the empirical data considering the chi-square (χ^2 (1,255, N = 290) = 644, p = 0.062) with the probability above .05 indicating not to reject the null hypothesis that the theoretical model fits the observed empirical data.

Assessment of the fit indices also showed that the proposed measurement model was in good fit with the empirical data according to the indices of comparative fit index (CFI) of 0.925, Tucker-Lewis Index (TLI) of 0.955, root mean square error of approximation (RMSEA) of 0.067, and standardized root mean squared residual (SRMR) of 0.073.

Hence, the second order CFA results confirm the hypothesis that the POINT measurement construct consists of eight distinct multidimensional components that are correlated and interlinked to one another and that the covariance among all of the item

statements can be accounted for by a single overall organisational innovativeness factor or POINT score.

Table 5.28: The Second-order CFA standardized factor loading results

| Indicators | Standardized 2 nd Order Factor Loading | Sig. | R ² |
|-----------------|---|-------|----------------|
| F1: Culture | .927 | - | .869 |
| F2: Leadership | .906 | .000* | .821 |
| F3: Strategy | .925 | .000* | .865 |
| F4: Workforce | .899 | .000* | .856 |
| F5: Resources | .804 | .000* | .729 |
| F6: Management | .933 | .000* | .883 |
| F7: Performance | .890 | .000* | .809 |
| F8: Network | .738 | .000* | .636 |

Table 5.28 shows the 2nd order CFA results of the standardized factor loadings of the eight factors to the overall POINT scores. The highest factor loading value was 0.933 in F6: Management innovativeness, followed by F1: Culture innovativeness factor loading of 0.927. All of the 2nd order factor loadings were above 0.800 except in F8: Networks innovativeness with factor loading value of 0.738.

The results of the 2nd order factor loading values were higher than the 1st order factor loading values under the same variables as expected since higher order CFA can be thought of as explicitly representing the causal constructs that impact the first order factors. Following the fact that the first order factors were used as indicators of the second order factors, the results showed that the strengths of the correlations of the 2nd order CFA follow similar trend as observed in the 1st order factor loading results in Table 5.27 in which F6: Management factor has the highest correlation contribution to POINT score, followed by F1: Culture, F3: Strategy, F2: Leadership, F4: Workforce, F7: Performance, and F8: Networks innovativeness respectively. Therefore, both results of 1st and 2nd order CFA prove that the proposed constructs are good representatives to represent and measure the overall POINT scores.

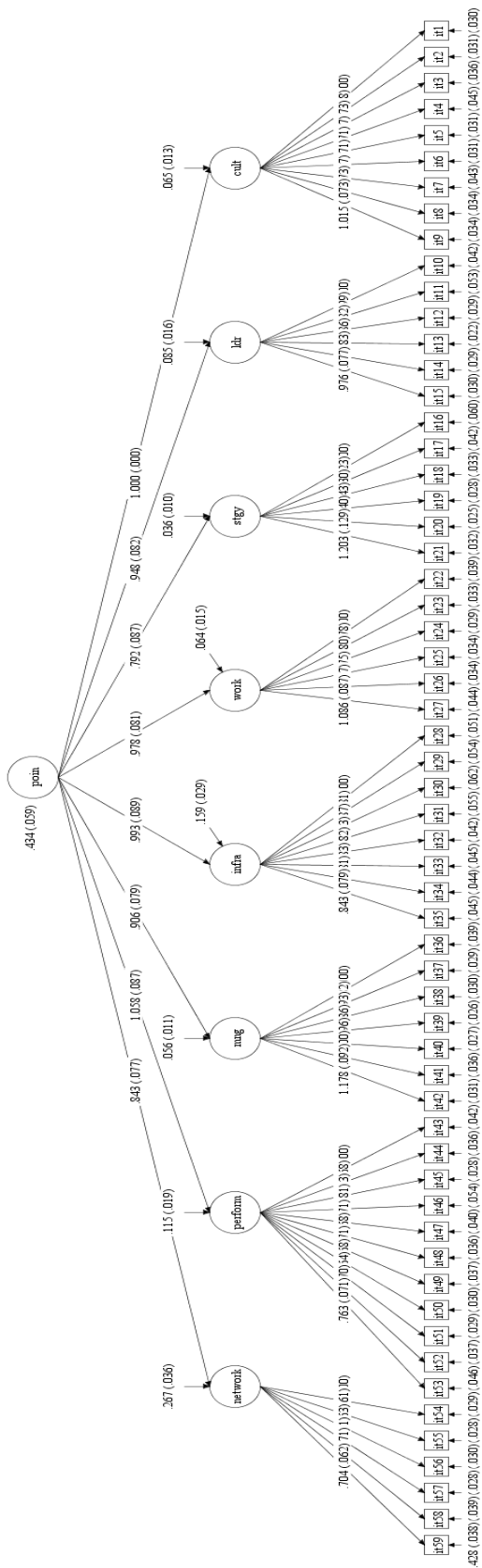


Figure 5.10:
 Second-order CFA of
 POINT
 Measurement Model

$\chi^2 = 1,225, df = 644, p = 0.062$

CFI = 0.925

TLI = 0.955

RMSEA = 0.067

SRMR = 0.073



5.8 Verification of POINT structural relationship model of performance innovativeness with F6: management innovativeness as the main mediator via SEM analysis

The POINT structural relationship model was proposed based on the IPO system concept and Contingency Effectiveness approach in which F6: Management factor was the main mediator between the input of exogenous independent F1 to F4 variables and F7: Performance factor as the endogenous dependent variable. F5: Resources and F8: Networks factors were proposed to directly influence all the other factors in the model. The model was verified with the empirical data via SEM analysis to find the causal relationships among all the constructs of the proposed variables and assume that the multivariate distribution is normally distributed.

The initial verification of the fit between POINT structural relationship model and the empirical results revealed that the proposed model did not fit the empirical data. Therefore, the researcher revised the model by considering the modification fit indices and allowed the measurement errors to correlate. The proposed and revised models of POINT structural relationship are shown in Figure 5.11.

The results of the goodness of fit indices of the proposed and revised POINT structural relationship models are summarised in Table 5.29.

Table 5.29: Goodness of fit indices of the proposed and revised POINT structural relationship models

| Goodness-of-Fit (GOF) | Cut-Off for Good Fit | Proposed Model | Fit | Revised Model | Fit |
|-----------------------|----------------------|----------------|-----|---------------|-----|
| χ^2 | ≤ 2.00 | 519.147 | X | 1.430 | ✓ |
| p-value | ≥ 0.05 | 0.000 | X | 0.488 | ✓ |
| CMIN/df | ≤ 2.00 | 51.915 | X | 0.810 | ✓ |
| CFI | ≥ 0.90 | 0.753 | X | 1.000 | ✓ |
| TLI | ≥ 0.95 | 0.332 | X | 1.000 | ✓ |
| RMSEA | Less than 0.08 | 0.419 | X | 0.000 | ✓ |
| SRMR | Less than 0.08 | 0.137 | X | 0.003 | ✓ |

The results of goodness of fit indices shows that the revised model fitted the empirical data judging from Chi-square value of $\chi^2 (2, N= 290) = 2.430, p = .488$; CMIN/df = .810, CFI = 1.000, TLI = 1.000, RMSEA = .000, and SRMR = .003. Therefore, the null hypothesis that the causal relationship model of performance innovativeness with management innovativeness as a mediator fits the empirical data was retained.

The construct validity of the revised POINT structural relationship model was also analysed based on the comparisons of the following three validity indicators:

- (1) Construct Reliability (CR) is computed from the squared sum of factor loadings for each construct and the sum of the error variance terms for that construct. The common assumption is that CR of 0.7 or higher suggests good reliability of the construct (Hair et al., 2010).
- (2) Convergent validity can be determined from the values of Average Variance Extracted (AVE) which is calculated as the mean variance extracted for the item loadings on a construct and is a summary indicator of convergence (Fornell & Larcker, 1981). The value of AVE of 0.5 or higher suggests good convergent validity. For convergent validity, AVE should be equal or greater than .50 and lower than CR. That is, variance explained by the construct should be greater than measurement error and greater than cross-loadings (Hair et al., 2010).
- (3) Discriminant validity is the extent to which a construct is truly distinct from other constructs in the model. Discriminant validity can be determined by comparing the AVE values of any two constructs with the squared of the correlation estimate between these two constructs (Hair et al., 2010). The AVE should be higher than the square correlation estimate to ensure that the variables correlate more highly within the same parent factor than to other outside factors. In this method, we obtained discriminant validity if AVE is greater than

maximum shared squared variance (MSV) or average shared squared variance (ASV).

To compute the convergent and discriminant validity, the calculation procedure proposed by Fornell & Larcker (1981) was used. The results of the construct validity, convergent validity, and discriminant validity of POINT structural model are summarised in Table 5.30 below.

Table 5.30: Summary of the construct validity, convergent validity, and discriminant validity of POINT structural model

| Factor | CR | Construct Reliability CR > 0.7 | AVE | Convergent Validity AVE > 0.5 | MSV | Discriminant Validity AVE > MSV |
|---------------|--------|-----------------------------------|--------|----------------------------------|--------|------------------------------------|
| F1: Culture | 0.9178 | ✓ | 0.7544 | ✓ | 0.7975 | X |
| F2: Leader | 0.9052 | ✓ | 0.7156 | ✓ | 0.7486 | X |
| F3: Strategy | 0.8744 | ✓ | 0.6423 | ✓ | 0.6286 | ✓ |
| F4: Workforce | 0.8678 | ✓ | 0.7261 | ✓ | 0.6317 | ✓ |
| F5: Resources | 0.8745 | ✓ | 0.7148 | ✓ | 0.6520 | ✓ |
| F6: Manage | 0.9151 | ✓ | 0.7867 | ✓ | 0.7475 | ✓ |
| F7: Perform | 0.9259 | ✓ | 0.7525 | ✓ | 0.6586 | ✓ |
| F8: Networks | 0.8966 | ✓ | 0.6938 | ✓ | 0.6141 | ✓ |

The results in Table 5.30 show that the CR values were from 0.8676 in F4: Workforce to 0.9259 in F7: Performance. The CR results indicate that the revised POINT structural model achieved good construct validity since all the CR values of all the eight factors were above 0.7. The convergent validity was also maintained because all the AVE values were more than 0.50 (from 0.6423 in F3: Strategy to 0.7867 in F6: Management) but lower than the corresponding CR values. That means that the variance explained by each construct is greater than its measurement error and the cross-loadings.

However, the discriminant validity of most of the POINT factors were achieved except for the case of F1: Culture and F2: Leadership innovativeness factors in which the values of AVE were greater than the corresponding MSV values. This

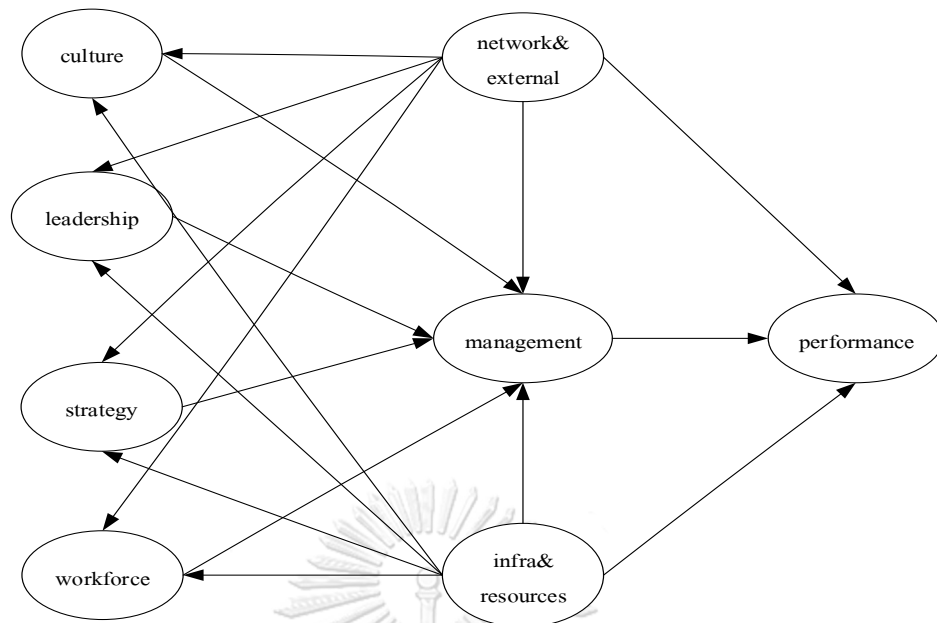
could be because the items designed for measuring F1: Culture and F2: Leadership innovativeness factors were cross-loadings onto the other factors in the model. The revised POINT structural model shown in Figure 5.11 also shows that there were statistically significant high cross-correlations from F1: Culture to F2: Leadership (path coefficient = 0.641), F1: Culture to F3: Strategy (path coefficient = 0.567), F1: Culture to F4: Workforce (path coefficient = 0.536), and F2: Leadership to F3: Strategy (path coefficient = 0.666).

Another alternative explanation to the discriminant validity issue observed in POINT model could arise from the assumption that the model is based the *reflective measurement theory* that the latent constructs cause the measured variables and that the error results in an inability to fully explain these measurement variables. However, some of the constructs may in fact follow the *formative measurement theory* that the measured variable can cause the construct and that the error is an inability of the measured variables to fully explain the constructs. Formative constructs are not considered latent but are viewed as indices where each indicator is a cause of the construct and considered a partial cause of the measurement index (Hair et al, 2010).

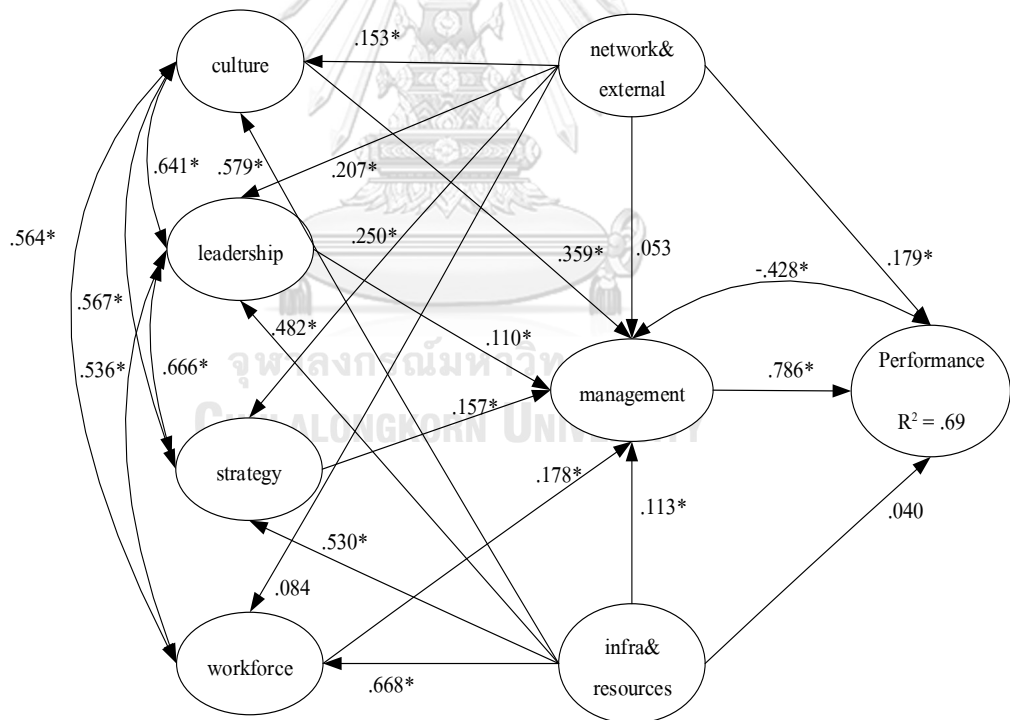
The SEM results of the direct, indirect, and total path effects of the revised POINT structural model are summarised in Table 5.31

**Table 5.31: Direct, indirect, and total relationship effects of
The revised POINT structural path relationship model**

| Independent variable | Revised POINT structural model | | | | | |
|----------------------|--------------------------------|----|-------|-------------|-------|-------|
| | Management | | | Performance | | |
| | DE | IE | TE | DE | IE | TE |
| F6: Management | - | - | - | .786* | - | .786* |
| F1: Culture | .359* | - | .359* | - | .282* | .282* |
| F2: Leadership | .110* | - | .110* | - | .087* | .087* |
| F3: Strategy | .157* | - | .157* | - | .123* | .123* |
| F4: Workforce | .178* | - | .178* | - | .140* | .140* |
| F5: Resources | .113* | - | .113* | .040 | .089* | .129* |
| F8: Networks | .053 | - | .053 | .179* | .042* | .221* |



Proposed POINT structural model



Revised POINT structural model

Figure 5.11: The proposed and revised POINT structural relationship models

In Table 5.31, the results of the direct effects in the revised model on F7: Performance innovativeness indicated that F6: Management factor and F8: Networks factor could directly affect F7: Performance innovativeness at a statistically significant level of .05 with the direct effects of 0.786 and 0.179 respectively. F5: Resources innovativeness contributes a small and insignificant direct effect to F7: Performance with the path coefficient value 0.040.

The results of the indirect effects on the endogenous dependent variable F7: Performance innovativeness indicated that all of the 6 variables, except F8: Networks factor, had the full mediation effects through management innovativeness at a statistically significant level of .05 with the indirect effects between 0.042 - 0.282.

The results of the total effects on F7: Performance innovativeness showed that F6: Management innovativeness factor has the highest total effects on the dependent variable F7: Performance innovativeness at a statistically significant level of .05 with the total effects of 0.786, followed by F1: Culture innovativeness, and F8: Networks factors with the total effects of 0.282 and 0.221 respectively.

The coefficient percentage prediction (R^2) value of F7: Performance innovativeness was 0.69 indicating that the overall effects of the variables in the model together could predict the dependent variable F7: Performance innovativeness by 69%. Therefore, the overall percentage prediction is considered to be in the high and acceptable range since there could be many other factors and sub-factors that can also affect the level of organisational innovativeness and were not covered in the proposed POINT model.

Strong direct effect of Management as mediator to dependent variable Performance innovativeness factor

F6: Management innovativeness factor is the main mediator connecting the independent variables F1: Culture, F2: Leadership, F3: Strategy, and F4: Workforce innovativeness to dependent variable F7: Performance innovativeness factor.

The observed direct effect of F6 to F7 was the strongest among all the correlate path relationships in the revised POINT structural model with statistically significant path coefficient value of 0.786. This result indicates that management practices and capability can strongly influence organisational performance. Therefore, innovative and highly performed organisation requires capable management division.

This SEM result of strong relationship between Management and Performance innovativeness variables also support the previous results of CFA in the POINT measurement model in which Management had the strongest loading factor and percentage of variance in comparison to other factors in the model.

The two-way negative effect reciprocal relationship between Management and Performance innovativeness factors

Remarkably, a particularly interesting finding is the fact that in the revised POINT structural model as shown in Figure 5.11, there was a backward two-way negative effect of -0.428 associating the endogenous variable F7: Performance innovativeness factor to the mediator F6: Management innovativeness factor. This negative effect of the management factor on the organisational performance means that the level of organisational performance is reciprocally reduced as the results of poor management practices and capability.

This observed two-way negative effect is indeed underlines the concept of the Organisational Ambidexterity as previously discussed in Chapter 2, section 2.1.4 and explains the competing balance between the need to adhere to firm, mechanistic, and uniform application of rules and procedures vs. the need to be flexible and organic to allow changes and innovation. As more public organisation employees would like to see performance improvement and contribute to more innovative outputs and outcomes, they feel that existing bureaucratic management style may result in ineffective internal processes and procedures that prevent them from being more effective and innovative.

This finding is in agreement with the previous studies by Bason, 2010; Boukamel & Emery, 2017; and March, 1991 that the disruptive nature of innovation

involving new changes are in contrast with the tendency of public agencies to adhere to stable work routines. This is one of the struggles many of the public organisations in ASEAN are currently facing and must overcome.

To be more innovative and competitive, the management process within public organisations should be reviewed periodically to receive inputs from their employees in all the relevant divisions and hierarchies. Existing management problems should be addressed in order to find better solutions for all stakeholders.

Comparison of the strengths of path coefficients of the POINT factors and their implications

Among the four factors (F1 – F4) that were modelled as the antecedents to the management process, the strengths of the correlations of direct and indirect effects can be compared based on the path coefficient values.

F1: Culture factor had the highest direct effect to F6: Management factor with statistically significant path coefficient value of 0.359. This finding implies that the empirical results were in good agreement with previous studies (Ruvio et al., 2013 and Onag et al, 2014) that the organisational norms and climates that encourage innovation and communication (namely creativity, openness, risk taking and failure tolerance, and NPM) can affect how the management operates and converts the available inputs and resources into the desirable results and outputs. Culture innovativeness can contribute to decentralized structure and cross-functional teamwork in the management factor.

The second highest direct effect from the input variables was F4: Workforce innovativeness with the statistically significant path coefficient value of 0.178. Workforce indicators in POINT model measured employees' competency, capability, and devotion to take positive actions to further organisation success. Some indicators of the Management factor measured the capability of the management to place the employees in the positions suitable to their skills and to retain talented and high

performing employees. Hence, innovative workforce can affect management practice and capability.

The third ranked of the direct effect from the input variables was F3: Strategy innovativeness with the statistically significant path coefficient value of 0.157. Some of the Strategy innovativeness indicators measure how well the organisation goals and mandates are shared and understood by all staff and that the employee work goals are clearly defined and aligned to the organisational goals. Promoting open communication and effective planning and follow-through are considered part of management functions. Therefore, Strategy innovativeness factor can be seen to affect management innovativeness factor in this scenario.

The fourth ranked of the direct effect from the input variables was F5: Resources innovativeness with the statistically significant path coefficient value of 0.113. Resources innovativeness indicators measure the ability of an organisation to allocate, leverage, and maximize its budgets, R&D, and ICT to create innovative outputs. The conversion resources into results can be considered part of management functions and therefore, resources innovativeness can affect the management factor.

Direct effects of Resources variable to other POINT factors

F5: Resources innovativeness strongly affect all of the four variables F1–F4 in the input side of the revised POINT structural model. The strongest direct effect observed from F5: Resources factor was to F4: Workforce innovativeness with the statistically significant path coefficient of 0.668, followed by to F1: Culture (0.579), F3: Strategy (0.530), and F2: Leadership (0.482). Strong path relationships of F5: Resources innovativeness factor to other input variables support the general belief that normally places the resources factor as one of the inputs in the IPO system model.

On the contrary, the direct effects of F5 to F6: Management factor was much weaker with the statistically significant path coefficient value of 0.113. Furthermore, even weaker direct effect of F5 to F7: Performance factor was observed with path coefficient value of 0.040. The result contradicts the general belief that highly performed organisation requires sufficient budgets, R&D, and good ICT infrastructure.

Direct effects of Networks variables to other POINT factors

F8: Networks & External context factor showed relatively weak direct effects to the input variables F1 – F4 with the statistically significant path coefficient values from the highest to the lowest of F3: Strategy (0.250), F2: Leadership (0.207), and F1: Culture (0.153) respectively. F8 also showed direct effect to dependent variable F7: Performance with statistically significant path coefficient value of 0.179. However, the direct effect of F8 to F6: Management factor was very weak with the path coefficient value of only 0.053. The results indicated that F8 did not contribute strongly to the other variables in the POINT measurement model. This conclusion supports the finding from the CFA results in which F8 was found to have the lowest factor loadings in both 1st and 2nd order CFA models.



CHAPTER 6

POINTINNO.COM WEB-BASED APPLICATION DEVELOPMENT

This chapter describes how POINTinno.com – an online web application to measure organisational innovativeness (OI) of public agencies was developed by utilising the weighted summation method to build the normalised POINT Index Scores. The scores are standardised to the maximum of 100 based on the results of user perception rating of the important factors affecting OI in public agencies, the average means of the indicators and POINT factors from the quantitative survey results, and the factor scores obtained from the first order CFA. K-Means Cluster analysis is then used to divide the POINT scores into 5 distinct groups in order to define the different levels of OI scores and separate users accordingly into POINT Index rankings.

The input data, automatic background program process to calculate POINT Scores and output information and recommendations for users of POINTinno.com application can be summarised in Figure 6.1 below.

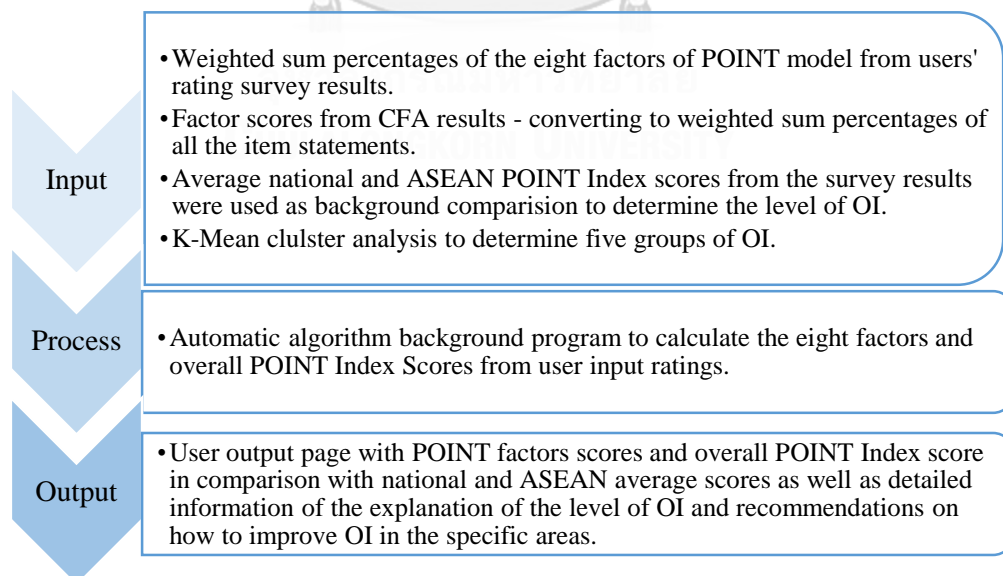


Figure 6.1: The input data, program process, and output for users in POINTinno.com application

6.1 Factors and indicators of POINTinno.com

Factors and indicators for measuring public organisational innovativeness were derived from the validated scales by factor analysis in Chapter 5. The 8 factors and 59 items of POINT measurement framework model were used to develop the measurement indicators of public organisational innovativeness in POINTinno.com web-based application program.

6.2 Development of the POINT index scores

Weighted summation method was used to create the Normalised POINT Scores in which the scores are standardised to the maximum of 100 based on the results of user perception rating of important factors affecting organisational innovativeness of public agencies. The organisational innovativeness indicators and POINT factors were obtained from the qualitative and quantitative results and the values of factor scores obtained from the first order CFA method.

Weighted summation is a simple method and has been widely used to identify and compare issues with a finite set of alternative choices to be addressed in order to meet the policy objectives related to multi-criteria decision making. Weights of different criteria can be obtained from different sources of expert ratings, users' opinions ranking, or available supporting data.

Factor loadings represent the correlations of each factor on the observed variables. Factor scores represent the weights of each factor affecting the observed variable. Therefore, in this study the factor scores can be converted into the weighted sum percentages of indicators in POINTinno.com online application.

In this study, weighted sum scores of the eight factors in POINT framework are calculated and used as the indicators to rank and compare POINT Index Scores in different ASEAN member countries and inform users of what areas they should focus on in order to improve their organisational innovativeness.

6.2.1 Calculations of the weighted sum percentages of the POINT factors

The rationale assumption here is that the results of user rating of important factors affecting OI in public organisations can be converted into the weighted sum percentages of the eight factors when calculating the total POINTinno score to measure the organisational innovativeness. The calculations of the weighted sum percentages of the eight factors of POINT are shown in Table 6.1

Table 6.1: Weighted sum percentages of the eight factors of POINTinno.com

| Factor | Mean | Weighted Sum Percentage |
|-----------------|------|-------------------------|
| F1: Culture | 4.63 | 13.00 |
| F2: Leadership | 4.73 | 13.28 |
| F3: Strategy | 4.36 | 12.24 |
| F4: Workforce | 4.57 | 12.83 |
| F5: Resources | 4.42 | 12.41 |
| F6: Management | 4.48 | 12.58 |
| F7: Performance | 4.11 | 11.54 |
| F8: Networks | 4.32 | 12.12 |
| Total | | 100.00 |

$$\begin{aligned}
 &\text{The total score of the eight factors of POINT} = \text{Mean of F1} + \text{Mean of F2} \\
 &+ \text{Mean of F3} + \text{Mean of F4} + \text{Mean of F5} + \text{Mean of F6} + \text{Mean of F7} + \text{Mean of F8} \\
 &= 4.63 + 4.73 + 4.36 + 4.57 + 4.42 + 4.48 + 4.11 + 4.32 \\
 &= 35.62
 \end{aligned}$$

$$\begin{aligned}
 &\text{Therefore, the weighted sum percentage of F1: Culture innovativeness is} \\
 &= (4.63 / 35.62) \times 100 \\
 &= 13.00 \%
 \end{aligned}$$

The results of the weighted sum percentages reflect the potential user perceptions of the ranking of the important factors affecting OI in public agencies. The highest weights are F2: Leadership innovativeness (13.28%), followed by F1: Culture innovativeness (13.00%) and F4: Workforce innovativeness (12.83%).

6.2.2 Standardized and weight adjusted mean average POINT scores of the ten ASEAN member countries

The survey results of the means of each factor of POINT with the maximum of 5 were converted into the maximum 100 or the unadjusted POINT Scores in the Table 6.3 by multiplying the means by 20. For example, the mean scores of F1: Culture of Brunei Darussalam was 2.93, converting this into the maximum 100 by $2.93 \times 20 = 58.67$. Then, using the weighted sum percentages in Table 6.2, the results of the adjusted mean averages of POINT scores of all the ten ASEAN member countries can be calculated as shown in Table 6.2 by recalculating the different weighted sum percentages of the eight factors of POINT. For example, the adjusted mean POINT score of Thailand F1: Culture innovativeness is calculated by 63.98 (unadjusted score) $\times 13.00\% / 12.50\% = 66.54$ (adjusted score). If the weights of all the eight factors are equal, each factor will have $100.00\% / 8 = 12.50\%$.

**Table 6.2: Standardized and adjusted mean POINT factor scores
of all the ten ASEAN countries**

| Factor | BN | CM | ID | LA | MS | MM | PH | SG | TH | VN |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Unadjusted POINT Scores | | | | | | | | | | |
| F1:Culture | 58.67 | 55.56 | 57.91 | 54.76 | 71.11 | 45.18 | 59.78 | 78.62 | 63.98 | 58.51 |
| F2:Leader | 62.67 | 48.90 | 61.57 | 57.87 | 66.83 | 50.00 | 55.33 | 69.23 | 66.27 | 53.33 |
| F3:Strategy | 63.33 | 59.27 | 68.43 | 66.67 | 76.33 | 62.23 | 64.33 | 82.30 | 69.37 | 68.13 |
| F4:Workforce | 62.00 | 56.30 | 65.70 | 56.97 | 68.40 | 61.10 | 61.00 | 83.33 | 71.40 | 62.97 |
| F5:Resources | 42.33 | 29.63 | 42.50 | 33.63 | 52.47 | 30.55 | 46.00 | 60.38 | 44.88 | 41.48 |
| F6:Manage | 56.57 | 52.69 | 57.97 | 54.80 | 70.34 | 50.49 | 61.14 | 77.80 | 61.74 | 57.46 |
| F7:Perform | 49.82 | 49.44 | 56.69 | 51.91 | 69.09 | 41.82 | 57.27 | 78.75 | 64.27 | 56.76 |
| F8:Network | 62.00 | 58.53 | 70.80 | 70.00 | 77.77 | 57.77 | 70.00 | 94.37 | 67.83 | 70.00 |
| Unadjusted Ave. POINT Score | 58.98 | 52.65 | 62.02 | 56.95 | 72.17 | 50.40 | 61.90 | 81.67 | 66.15 | 60.64 |
| Weight Adjusted POINT Scores | | | | | | | | | | |
| F1:Culture | 61.02 | 57.78 | 60.23 | 56.95 | 73.95 | 46.99 | 62.17 | 81.76 | 66.54 | 60.85 |
| F2:Leader | 66.58 | 51.95 | 65.41 | 61.48 | 71.00 | 53.12 | 58.78 | 73.55 | 70.41 | 56.66 |
| F3:Strategy | 62.01 | 58.04 | 67.01 | 65.28 | 74.74 | 60.94 | 62.99 | 80.59 | 67.93 | 66.71 |
| F4:Workforce | 63.64 | 57.79 | 67.43 | 58.47 | 70.21 | 62.71 | 62.61 | 85.53 | 73.28 | 64.63 |
| F5:Resources | 42.03 | 29.42 | 42.19 | 33.39 | 52.09 | 30.33 | 45.67 | 59.95 | 44.56 | 41.18 |
| F6:Manage | 56.93 | 53.03 | 58.34 | 55.15 | 70.79 | 50.81 | 61.53 | 78.30 | 62.14 | 57.83 |
| F7:Perform | 45.99 | 45.64 | 52.34 | 47.92 | 63.78 | 38.61 | 52.87 | 72.70 | 59.33 | 52.40 |
| F8:Network | 60.12 | 56.75 | 68.65 | 67.87 | 75.41 | 56.01 | 67.87 | 91.50 | 65.77 | 67.87 |
| Adjusted Country Ave. POINT Score | 57.29 | 51.30 | 60.20 | 55.82 | 69.00 | 49.94 | 59.31 | 77.98 | 63.74 | 58.52 |

The unadjusted and adjusted mean average of the overall ASEAN POINT factor scores are calculated and shown in Table 6.3

Table 6.3: Comparison of the unadjusted and adjusted averages of the overall ASEAN POINT factor scores

| Factor | Unadjusted overall score | Adjusted score |
|------------------------------------|--------------------------|----------------|
| F1: Culture IT01 - IT09 | 60.41 | 62.82 |
| F2: Leadership IT10 – IT15 | 59.20 | 62.89 |
| F3: Strategy IT16 – IT21 | 68.04 | 66.62 |
| F4: Workforce IT22 – IT27 | 64.92 | 66.63 |
| F5: Resources IT28 – IT35 | 42.39 | 42.08 |
| F6: Management IT36 – IT42 | 60.10 | 60.48 |
| F7: Performance IT43 – IT53 | 57.58 | 53.16 |
| F8: Network IT54 – IT59 | 69.91 | 67.78 |
| Overall ASEAN POINT index score | 60.31 | |

The normalised and adjusted ASEAN average POINT factor scores were used in the development of the measurement background program of POINTinno.com.

The results of the average adjusted POINT Index Scores of the ten ASEAN member countries from the survey show that there were three countries namely 1) Singapore, 2) Malaysia, and 3) Thailand with the average adjusted POINT Index Scores of 77.98, 69.00, and 63.74 respectively that were above the average score of 60.31. The rest of ASEAN member countries had the scores below the average in the following order: 4) Indonesia (60.20), 5) Philippines (59.31), 6) Vietnam (58.52), 7) Brunei Darussalam (57.29), 8) Lao PDR (55.82), 9) Cambodia (51.30) and 10) Myanmar (49.94)

6.2.3 Comparison of rankings of POINT Index Scores to Global Competitiveness Index (GCI) and Global Innovation Index (GII)

Comparison of the rankings of the standardised and adjusted POINT scores or POINT Index Scores used in developing POINTInno.com application to (1) World Economic Forum (WEF): Global Competitiveness Index (GCI) 2017-2018 (World Economic Forum, 2017), (2) GCI Innovation Indicator, (3) Global Innovation Index (GII) (Cornell, INSEAD, and WIPO, 2018), and (4) GII Government Effectiveness Indicator of the ten ASEAN countries are shown in Table 6.4. The values in brackets are the internal rankings among the ten ASEAN countries.

Table 6.4: Comparison of POINT Index rankings to WEF Overall GCI 2017-2018, GCI Innovation Indicator, Overall GII 2018, and GII Government Effectiveness Indicator of the ten ASEAN countries

| ASEAN countries | GCI Overall Ranking | GCI Innovation Indicator | GII 2018 Overall Ranking | GII 2018 Government Effectiveness | POINT Index Scores |
|---|---------------------|--------------------------|--------------------------|-----------------------------------|--------------------|
| Brunei | 46 (5) | 80 (7) | 67 (5) | 29 (3) | 57.29 (7) |
| Cambodia | 94 (8) | 110 (9) | 98 (8) | 111 (8) | 51.30 (9) |
| Indonesia | 36 (4) | 31 (3) | 85 (7) | 70 (5) | 60.20 (4) |
| Lao PDR | 98 (9) | 81 (8) | N/A (9) | N/A (9) | 55.82 (8) |
| Malaysia | 23 (2) | 22 (2) | 35 (2) | 38 (2) | 69.00 (2) |
| Myanmar | N/A (10) | N/A (10) | N/A (10) | N/A (10) | 49.94 (10) |
| Philippines | 56 (7) | 65 (5) | 73 (6) | 73 (7) | 59.31 (5) |
| Singapore | 3 (1) | 9 (1) | 5 (1) | 1 (1) | 77.98 (1) |
| Thailand | 32 (3) | 50 (4) | 44 (3) | 50 (4) | 63.74 (3) |
| Vietnam | 55 (6) | 71 (6) | 45 (4) | 71 (6) | 58.52 (6) |
| Similarity ranking percentage of POINT Index in comparison to other Indices | | | | | |
| To Overall GCI Rankings | | 60% | | | |
| To GCI Innovation Indicator Rankings | | 80% | | | |
| To Overall GII Rankings | | 40% | | | |
| To GII Government Effectiveness Rankings | | 40% | | | |

The results in Table 6.4 show that the rankings of the POINT Index Scores are in good agreement i.e. 60% correctly matched with the overall GCI rankings and 80% correctly matched with the rankings of the Innovation indicator. The top ranked GCI and POINT Index Scores were the same namely 1st Singapore, 2nd Malaysia, 3rd Thailand, and 4th Indonesia. The low ranked Innovation indicators and POINT Index Scores were 10th Myanmar, 9th Cambodia, and 8th Lao PDR.

Rankings of POINT Index are 40% similar to the overall GII and GII Government Effectiveness Indicator rankings. POINT Index ranked Singapore and Malaysia at the top two countries in ASEAN similar to the overall GII and GII Government Effectiveness Indicator rankings.

Therefore, it can be concluded that POINT Index Scores developed in this research study can be sufficiently used to measure and compare the organisational innovativeness levels of public agencies in ASEAN in the web-based online POINTinno.com application as intended.

6.2.4 Converting factor scores obtained from the CFA results into weighted sum percentages of the 59 indicators of POINTinno.com

The factor scores of all the items obtained from the first order CFA analysis can be converted into the corresponding weighted sum percentages of the 59 indicators of all the eight factors in POINTinno.com online web-based application. The summary list of all the factors scores and the corresponding weighted sum percentages of all the indicators and factors of POINTinno.com are shown in Table 6.5. The weighted sum percentages of each factor were subsequently used as input weights of the indicators of POINTinno.com web-based application.

Table 6.5: Factor scores and the weighted sum percentages of all the indicators in POINTinno.com

| Factor and indicator | Factor loading | Factor score | Weighted sum percentage |
|----------------------|----------------|--------------|-------------------------|
| F1: IT01 | .811 | .155 | 16.419 |
| F1: IT02 | .769 | .153 | 16.208 |
| F1: IT03 | .752 | .078 | 8.263 |
| F1: IT04 | .725 | .131 | 13.877 |
| F1: IT05 | .820 | .158 | 16.737 |
| F1: IT06 | .803 | .144 | 15.254 |
| F1: IT07 | .631 | .033 | 3.496 |
| F1: IT08 | .685 | .045 | 4.767 |
| F1: IT09 | .675 | .047 | 4.979 |
| F2: IT10 | .725 | .124 | 14.904 |
| F2: IT11 | .732 | .097 | 11.659 |
| F2: IT12 | .812 | .129 | 15.505 |
| F2: IT13 | .907 | .297 | 35.697 |
| F2: IT14 | .808 | .123 | 14.784 |
| F2: IT15 | .720 | .062 | 7.452 |
| F3: IT16 | .536 | .023 | 3.517 |
| F3: IT17 | .568 | .022 | 3.364 |
| F3: IT18 | .663 | .020 | 3.058 |
| F3: IT19 | .917 | .321 | 49.083 |
| F3: IT20 | .839 | .091 | 13.914 |
| F3: IT21 | .779 | .177 | 27.064 |
| F4: IT22 | .680 | .216 | 16.901 |

| Factor and indicator | Factor loading | Factor score | Weighted sum percentage |
|-----------------------------|-----------------------|---------------------|--------------------------------|
| F4: IT23 | .406 | -.272 | 21.283 |
| F4: IT24 | .665 | .191 | 14.945 |
| F4: IT25 | .799 | .222 | 17.371 |
| F4: IT26 | .727 | .170 | 13.302 |
| F4: IT27 | .841 | .207 | 16.197 |
| F5: IT28 | .599 | .139 | 8.522 |
| F5: IT29 | .560 | .040 | 2.452 |
| F5: IT30 | .561 | .258 | 15.819 |
| F5: IT31 | .998 | .450 | 27.590 |
| F5: IT32 | .821 | .364 | 22.318 |
| F5: IT33 | .795 | .249 | 15.267 |
| F5: IT34 | .670 | .018 | 1.104 |
| F5: IT35 | .695 | .113 | 6.928 |
| F6: IT36 | .646 | .053 | 6.355 |
| F6: IT37 | .746 | .107 | 12.830 |
| F6: IT38 | .842 | .171 | 20.504 |
| F6: IT39 | .806 | .120 | 14.388 |
| F6: IT40 | .860 | .186 | 22.302 |
| F6: IT41 | .724 | .049 | 5.875 |
| F6: IT42 | .781 | .148 | 17.746 |
| F7: IT43 | .804 | .250 | 19.763 |
| F7: IT44 | .691 | .010 | 0.791 |
| F7: IT45 | .723 | -.073 | 5.771 |
| F7: IT46 | .778 | .234 | 18.498 |
| F7: IT47 | .695 | .035 | 2.767 |
| F7: IT48 | .681 | -.034 | 2.688 |
| F7: IT49 | .711 | -.003 | 0.237 |
| F7: IT50 | .854 | .323 | 25.534 |
| F7: IT51 | .772 | .126 | 9.960 |
| F7: IT52 | .751 | .176 | 13.913 |
| F7: IT53 | .607 | .001 | 0.079 |
| F8: IT54 | .714 | .054 | 6.888 |
| F8: IT55 | .740 | .054 | 6.888 |
| F8: IT56 | .744 | .076 | 9.694 |
| F8: IT57 | .863 | .104 | 13.265 |
| F8: IT58 | .822 | .308 | 39.286 |
| F8: IT59 | .629 | .188 | 23.980 |

From the calculated factor weights in Table 6.1 and individual weight of each item statement from the CFA factor scores in Table 6.5, the equation to calculate the overall POINT Index Score based on the user rating of 1.0 to 5.0 or the user input scale (UIS) values from 0.20 to 1.00 in the overall equation of the automatic algorithm program is as follows:

$$\begin{aligned} \text{Overall POINT Index Score} = & \text{Factor score F1} + \text{Factor score F2} + \\ & \text{Factor score 3} + \text{Factor score F4} + \text{Factor score F5} + \text{Factor score F6} + \\ & \text{Factor score F7} + \text{Factor score F8} \end{aligned}$$

$$\begin{aligned} \text{Overall POINT Index Score} = & \text{F1}(13.00)\text{IT01-IT09} + \text{F2}(13.28)\text{IT10-IT15} \\ & + \text{F3}(12.24)\text{IT16-IT21} + \text{F4}(12.83)\text{IT22-IT27} + \text{F5}(12.41)\text{IT28-IT35} + \text{F6}(12.58)\text{IT36-} \\ & \text{IT42} + \text{F7}(11.54)\text{IT43-IT53} + \text{F8}(12.12)\text{IT54-IT59} \end{aligned}$$

$$\begin{aligned} \text{Overall POINT Index Score} = & 13.00 \times (0.16419 \times \text{UIS1} + 0.16208 \times \text{UIS2} \\ & + 0.08263 \times \text{UIS3} + 0.13877 \times \text{UIS4} + 0.16737 \times \text{UIS5} + 0.15254 \times \text{UIS6} + 0.03496 \times \\ & \text{UIS7} + 0.04767 \times \text{UIS8} + 0.04979 \times \text{UIS9}) + \\ & 13.38 \times (0.14904 \times \text{UIS10} + 0.11659 \times \text{UIS11} + 0.15505 \times \text{UIS12} + 0.35697 \\ & \times \text{UIS13} + 0.14784 \times \text{UIS14} + 0.07552 \times \text{UIS15}) + \\ & 12.24 \times (0.03517 \times \text{UIS16} + 0.03364 \times \text{UIS17} + 0.03058 \times \text{UIS18} + 0.49083 \\ & \times \text{UIS19} + 0.13914 \times \text{UIS20} + 0.27064 \times \text{UIS21}) + \\ & 12.83 \times (0.16901 \times \text{UIS22} + 0.21283 \times \text{UIS23} + 0.14945 \times \text{UIS24} + 0.17371 \\ & \times \text{UIS25} + 0.13302 \times \text{UIS26} + 0.16197 \times \text{UIS27}) + \\ & 12.41 \times (0.08522 \times \text{UIS28} + 0.02452 \times \text{UIS29} + 0.15819 \times \text{UIS30} + 0.27590 \\ & \times \text{UIS31} + 0.22318 \times \text{UIS32} + 0.15267 \times \text{UIS33} + 0.01104 \times \text{UIS34} + 0.6928 \times \text{UIS35}) \\ & + \\ & 12.58 \times (0.06355 \times \text{UIS36} + 0.12830 \times \text{UIS37} + 0.20504 \times \text{UIS38} + 0.14388 \\ & \times \text{UIS39} + 0.22302 \times \text{UIS40} + 0.05875 \times \text{UIS41} + 0.17746 \times \text{UIS42}) + \\ & 11.54 \times (0.19763 \times \text{UIS43} + 0.00791 \times \text{UIS44} + 0.05771 \times \text{UIS45} + 0.18598 \\ & \times \text{UIS46} + 0.02767 \times \text{UIS47} + 0.02688 \times \text{UIS48} + 0.00237 \times \text{UIS49} + 0.25534 \times \text{UIS50} \\ & + 0.09960 \times \text{UIS51} + 0.13913 \times \text{UIS52} + 0.00079 \times \text{UIS53}) + \\ & 12.12 \times (0.06888 \times \text{UIS54} + 0.06888 \times \text{UIS55} + 0.09694 \times \text{UIS56} + 0.13265 \\ & \times \text{UIS57} + 0.39286 \times \text{UIS58} + 0.23980 \times \text{UIS59}). \end{aligned}$$

Where UIS_n = User Input Scale with values from 0.20 – 1.00 based on the actual answer of 1.00 – 5.00 Likert's scale rating of question n and n is from 1-59.

6.3 Cluster analysis of the total POINT Index Scores into distinct groups

K-means cluster analysis used to determine how many clusters of the total POINT scores can be grouped together from the survey results. The number of groups should be from 3 to 5 in order to separate and categorise the users' POINT Index Scores into different levels of organisational innovativeness. The results of the total POINT scores out of the possible 295 (59 items x 5 rating maximum) obtained from the survey respondents are shown in Table 6.6

Table 6.6: The results of the total POINT scores and the corresponding number of respondents (n=290)

| Total POINT scores | Number of responses | Percentage |
|--------------------|---------------------|--------------|
| 0 - 30 | 0 | 0.0 |
| 31 - 60 | 2 | 0.7 |
| 61 - 90 | 1 | 0.3 |
| 91 - 120 | 8 | 2.8 |
| 121 - 150 | 21 | 7.2 |
| 151 - 180 | 75 | 25.9 |
| 181 - 210 | 94 | 32.4 |
| 211 - 240 | 58 | 20.0 |
| 241 - 270 | 25 | 8.6 |
| 271 - 295 | 6 | 2.1 |
| Total | 290 | 100.0 |

The results in Table 6.6 show that there were the highest number of responses of 32.4% (94 responses) or nearly one third in the POINT score range of 181-210, followed by the POINT score range of 151-180 with the number of responses of 25.9% (75 responses), and the POINT score range of 211-240 with the number of responses of 20.0% (58 responses) respectively.

The percentile plots of the total POINT scores of all the respondents (n = 290) are shown in Figure 6.2.

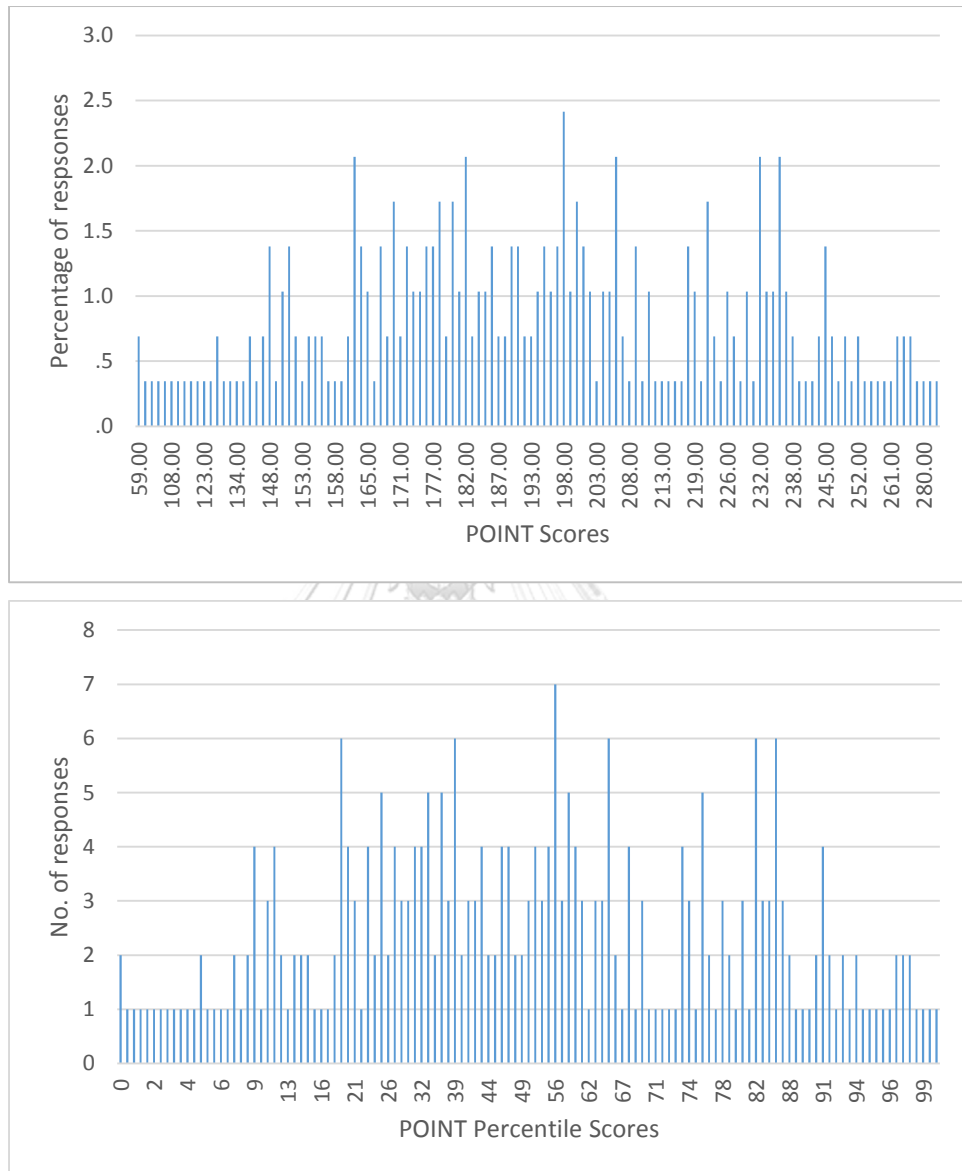


Figure 6.2: Percentile graphs of the survey results of all the respondents' (n=290) total POINT scores of the organisational innovativeness of public agencies in ASEAN

Table 6.7: K-Means cluster analysis when clusters no. are 3, 4, and 5

| No. of clusters | K=3 | | | K=4 | | | | K=5 | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 |
| No. of cases | 60 | 146 | 84 | 18 | 103 | 104 | 65 | 17 | 74 | 105 | 64 | 30 |
| Final centroid of total scores | 140.2 | 188.7 | 238.9 | 108.3 | 166.6 | 202.2 | 244.6 | 106.8 | 160.6 | 192.0 | 225.5 | 257.9 |
| Distances (D) between Clusters of Centroids (Differences of Total Scores) | | | | | | | | | | | | |
| 1 | 0.0 | 48.5 | 98.7 | 0.0 | 58.3 | 93.9 | 136.3 | 0.0 | 53.8 | 85.2 | 118.7 | 151.1 |
| 2 | | 0.0 | 50.2 | | 0.0 | 35 | 78 | | 0.0 | 31.4 | 64.9 | 97.3 |
| 3 | | | 0.0 | | | 0.0 | 43 | | | 0.0 | 33.5 | 65.9 |
| 4 | | | | | | | 0.0 | | | | 0.0 | 32.4 |
| 5 | | | | | | | | | | | | 0.0 |

The number of clusters (K) and the distances (D) between the centroids are shown in Table 6.7. When K = 3, the centroids or the centres of average POINT scores lie at 140.2, 188.7, and 238.9. When K = 4, the centroids are 108.3, 166.6, 202.2, and 244.6. When K = 5, the centroids are 106.8, 160.6, 192.0, 225.5, and 257.9. The centroids and the distances between the centroids when K = 5 were chosen because all the five centroids cover wider range of suitable POINT Index Scores in comparison to other cases.

The five levels of the normalised POINT Indices are named similarly to the five levels of the income per capita for comparison.

| | |
|--------------------------|-----------------------------------|
| Level 1: Low OI | POINT Index Range: 20.00 – 45.76 |
| Level 2: Lower Middle OI | POINT Index Range: 45.77 – 60.34 |
| Level 3: Middle OI | POINT Index Range: 60.35 – 74.91 |
| Level 4: Upper Middle OI | POINT Index Range: 74.92 – 89.49 |
| Level 5: High OI | POINT Index Range: 89.50 – 100.00 |

Table 6.8: Levels, ranges, score widths, and midpoints of scores of public organisational innovativeness in POINinno.com online tool

| Level | Range of Total Score | Level Score Width | Midpoint of Score | Centroid | Adjusted Range of POINT Score | Adjusted Level Score Width | Midpoint of POINT Score |
|-------|----------------------|-------------------|-------------------|----------|-------------------------------|----------------------------|-------------------------|
| 1 | 59.00 – 134.99 | 75.99 | 97.00 | 107.00 | 59.00 – 134.99 | 75.99 | 97.00 |
| 2 | 135.00 – 177.99 | 42.99 | 156.50 | 161.00 | 135.09 – 177.99 | 42.99 | 156.50 |
| 3 | 178.00 – 209.99 | 31.99 | 194.50 | 192.00 | 178.00 – 220.99 | 42.99 | 199.50 |
| 4 | 210.0 – 242.99 | 32.99 | 226.50 | 226.00 | 221.00 – 263.99 | 42.99 | 242.50 |
| 5 | 243.0 – 295.00 | 52.00 | 269.00 | 258.00 | 264.00 – 295.00 | 31.00 | 279.50 |

The ranges of POINT scores in the five levels of organisational innovativeness are shown in Table 6.8 and the resulting five centroids are adjusted to the nearest full scores at 107, 161, 192, 226, and 258 respectively. For more equal ranges of score width, the centroids are adjusted slightly to match the midpoint scores in each level and normalised to the maximum of 100 as shown in Table 6.9. The minimum unnormalised POINT score when users answer all the question items is 59 (1 point x 59 items) and the maximum score is 295 (5 point x 59). The minimum normalised POINT score is 20 and the maximum normalised POINT score is 100.

Table 6.9: Normalised levels, ranges, score widths, and midpoints of scores of organisational innovativeness in POINinno.com online application

| Level | Level Name | POINT Score Range | Mid POINT Score | Normalised POINT Score Range | Normalised Score Width | Normalised Midpoint |
|-------|------------------------------|-------------------|-----------------|------------------------------|------------------------|---------------------|
| 1 | Low Innovativeness | 59.00 – 134.99 | 97.00 | 20.00 – 45.76 | 25.76 | 32.88 |
| 2 | Lower Middle Innovativeness | 135.00 – 177.99 | 156.50 | 45.77 – 60.34 | 14.57 | 53.05 |
| 3 | Middle Innovativeness | 178.00 – 220.99 | 199.50 | 60.35 – 74.91 | 14.56 | 67.63 |
| 4 | Higher Middle Innovativeness | 221.00 – 263.99 | 242.50 | 74.92 – 89.49 | 14.57 | 82.20 |
| 5 | High Innovativeness | 264.00 – 295.00 | 279.50 | 89.50 – 100.00 | 10.50 | 94.75 |

6.4 Outputs and user recommendation page of POINTinno.com

The outputs of the POINT scores of the eight factors and the overall POINT Index Score that are normalised to the maximum of 100 are shown in the user output page of POINTinno.com online application after users answering all the indicator statement pages of the rating of their organisational innovativeness (OI). The POINT Index Scores are shown in the output page in comparison with the average scores in the three levels of 1) other users from the same organisation, 2) the national average, and 3) the ASEAN average. The measurement of POINT Index Scores in POINTinno.com application can assist users to understand what their OI level lies and able to select the right specific areas with the scores lower than the other factors or below national or ASEAN average to focus on the improvement as a strategic decision support system.

The comparison of the POINT Index Scores in different levels of own user rating, average organisational rating, national average, and ASEAN average are shown as a spider web graph as in Figure 6.3.

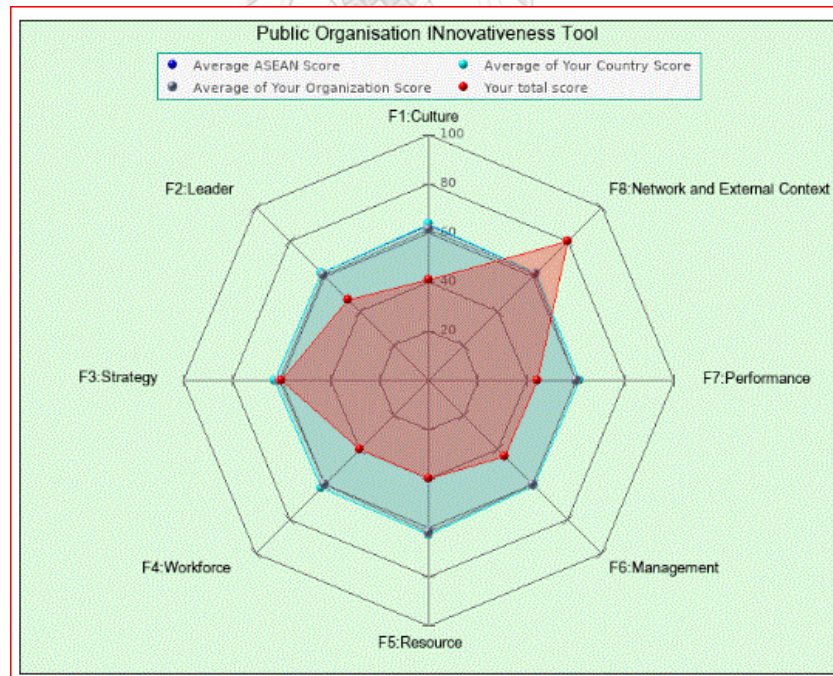


Figure 6.3: Spider web graph of the POINT index scores comparing user own rating, organisational average, national average, and ASEAN average scores of the user output page in POINTinno.com

Based on the final organisation average POINT Index Score obtained after a registered user completes answering all the indicator statement in the online pages, the program in POINTinno.com application will then determine what level of OI the users' organisation lie and automatically select one of the following five levels of OI to display in the user output page. The explanations and recommendations for users of what the five levels of OI mean are summarised in Table 6.10

Table 6.10: Summary of user explanations and recommendations of what the five levels of POINT organisational innovativeness represent

| POINT level | User explanation and recommendation |
|--|--|
| Level 1: Low OI POINT Index Range: 20.00 – 45.76 | <p>Your organisation has overall Low propensity, tendency, and capability to innovate in comparison to other public organisations in ASEAN.</p> <p>You need to start shifting and challenging the old ways of doing things in order to be more innovative and competitive.</p> <p>Focus on the eight recommended factors in POINTinno.com that your organisation scored below the national and ASEAN average.</p> <p>You can begin by starting to improve the factor with the lowest score first. Then make planning to continue to focus resources into other factors that are below average.</p> <p>Innovation is a process that is best managed with a long term perspective, not necessarily measured in long time increments of months or years but rather in completion of targeted goals.</p> <p>This requires separating the innovation process into three implementable stages: 1) identification of goals and exploration activities, 2) short term deliverables and 3) near term development.</p> |

| POINT level | User explanation and recommendation |
|--|---|
| | <p>It is management's responsibility to assess performance to goals in each stage and to determine when a goal has been completed or moved into a different stage.</p> <p>By splitting the execution phase into 2 stages of short term deliverables and near term development, the innovation process is positioned to yield a continuous flow of near term successes, which maintains workforce motivation to innovate.</p> <p>Consider engaging with external expert consultancy in innovation management to motivate your workforce and increase your capability to develop non-technological or administration innovations (i.e. improvement of internal operations, effectiveness, and efficiency) in your organisation.</p> |
| <p>Level 2: Lower Middle OI POINT Index Range: 45.77 – 60.34</p> | <p>Your organisation has overall Lower-Middle propensity, tendency, and capability to innovate in comparison to other public organisations in ASEAN.</p> <p>Focus on the eight recommended factors in POINTinno.com that your organisation scored below the national and ASEAN average. You can begin by starting to improve the factor with the lowest score.</p> <p>Innovation is a process that is best managed with a long term perspective, not necessarily measured in long time increments of months or years but rather in completion of targeted goals. This requires separating the innovation process into three implementable stages: 1) identification of goals and exploration activities, 2) short term deliverables and 3) near term development.</p> |

| POINT level | User explanation and recommendation |
|--|--|
| | <p>It is management's responsibility to assess performance to goals in each stage and to determine when a goal has been completed or moved into a different stage.</p> <p>By splitting the execution phase into 2 stages of short term deliverables and near term development, the innovation process is positioned to yield a continuous flow of near term successes, which maintains workforce motivation to innovate.</p> <p>You might also consider engaging with external expert consultancy in innovation management to motivate your workforce and increase your capability to develop non-technological innovations or administration innovations (i.e. improvement of internal operations, effectiveness, and efficiency) in your organisation.</p> |
| <p>Level 3: Middle OI POINT Index Range: 60.35 – 74.91</p> | <p>Your organisation has overall Middle propensity, tendency, and capability to innovate in comparison to other public organisations in ASEAN.</p> <p>Check the results of all the eight factors in POINTinno.com that affect organisational innovativeness for more details to see in which areas your organisation scores are lower than the average scores of other organisations in your country and ASEAN.</p> <p>Assign change manager or specific team to lead and identify the targets, create the project plan, carry out the operation, and put necessary resources into implementations of those areas.</p> |
| <p>Level 4: Upper Middle OI POINT Index Range: 74.92 – 89.49</p> | <p>Your organisation has overall Upper-Middle propensity, tendency, and capability to innovate in comparison to other public organisations in ASEAN.</p> |

| POINT level | User explanation and recommendation |
|---|---|
| | <p>Keep attaining the culture and practice that motivate your workforce to constantly innovate but also adjust the organisation goals to achieve the future vision that includes creating more values, better services, and positive outcome and impact to the public.</p> <p>Brainstorm and discuss among all the different departments and ranks about how to utilise existing resources more effectively and efficiently. Can the internal processes and operational methods be further improved?</p> |
| <p>Level 5: High OI POINT Index Range: 89.50 – 100.00</p> | <p>Congratulations. Your organisation has overall High propensity, tendency, and capability to innovate in comparison to other public organisations in ASEAN.</p> <p>Keep attaining the culture and practice that motivate your workforce to constantly innovate but also adjust the organisation goals to achieve the future vision that includes creating more values, better services, and positive outcome and impact to the public.</p> <p>Can you organisation create enough leaders and mentors to maintain the lead and competitiveness in the future? Have your set your organisation goals to effectively combat new emerging societal problems and challenges? Do you have effective measures and policies to tackle them?</p> |

The rationales behind different user explanations and recommendations for different levels of OI in Table 6.11 are that level 1: Low OI and level 2: Lower-Middle OI agencies require more assistance in paradigm shifting than organisations with high OI towards the necessary changes to become more innovative and competitive. Help and assistance such as consultancy with external experts may be required for low OI agencies.

Level 3: Middle OI agencies should be able to strategically select areas of OI that they are still lacking behind in comparison to the national and ASEAN averages in order to improve upon by assigning internal team leader and unit to implement projects and initiatives.

Level 4: Upper-Middle agencies should be able to improve to become high OI level by brainstorm and discuss among all the different departments and ranks about how to utilise existing resources more effectively and efficiently.

Level 5: High OI agencies should maintain their lead ranking by creating more leaders and mentors and thinking of long-term future goals in tackling challenging societal problems and challenges.

**Table 6.11: User explanations and recommendations
for each of the eight factors of POINT**

| POINT factor | User explanation and recommendation |
|------------------------------------|---|
| Factor 1 Culture innovativeness | Culture innovativeness is the organisational norm and climate that encourage innovation, communication, and improve performance and competitiveness. The cultures that are believed to foster innovation are creativity, openness, risk taking and failure tolerance, non-bureaucratic and efficient businesslike practices. Innovative culture serves as a catalyst of innovations, while lacking it acts as blocker of innovations. |

| POINT factor | User explanation and recommendation |
|---|--|
| | <p>Innovation starts with innovative culture and mindset. You can improve culture innovativeness of your organisation by creating more open communication channels among all the employees across different ranks and departments within the organisation to share ideas, discuss problems, and find possible solutions to overcome the challenges and improve the current ways of doing things. There can be no improvement if there are no failures that will lead to positive changes of the current norms and practices.</p> |
| <p>Factor 2 Leadership innovativeness</p> | <p>Leadership innovativeness refers to the organisation top executive leader attitudes and behaviours toward innovation that can transform organisation performance and competitiveness. Innovative leaders convey clear sense of strategic direction that inspires and unites the organisation, provide opportunities and environment that conducive to innovation, support employee learning and development, recognise, reinforce, and reward new ideas and actions for improvements, open and positively responsive to changes and challenges, have realistic visions of the future, and keep subordinates informed and involved in important decision making processes.</p> <p>In public organisations, innovative leaders provide ministers and government with expert advices based on research and indicators to effectively tackle society problems and challenges whilst maintaining operational integrity. If you are a leader of an organisation or a team leader, do you have these characteristics of innovative leadership to transform your organisation and project to success?</p> |
| <p>Factor 3 Strategy innovativeness</p> | <p>Strategy innovativeness refers to strategic initiations towards innovation or the capability of</p> |

| POINT factor | User explanation and recommendation |
|--------------|--|
| | <p>the organisation to recognise new opportunities and societal challenges and successfully integrated them into the organisation strategic targets and operations in order to deliver better services to the public.</p> <p>Innovative public organisations have effective follow-through mechanism to mitigate changes in government priorities, political mandates, and policies whilst increasing resilience and improving its performance and competitiveness.</p> <p>You can improve strategy innovativeness of your organisation by following the cycle of Plan-Do-Check-Act (PDCA) of (1) designing the right strategic plans, (2) implement the plan and measure its performance, (3) assess the measurements and report the results, and (4) decide and act on the changes needed to improve the process and operation. The changes in the strategic plans and results are then shared and articulately conveyed to all employees. Technical and non-technical innovation and innovation related activities are essential for improvement and need to be recognised as part of your organisation's mission and strategic plans. Employees' work goals should be clearly defined against measureable criteria along with operation mechanisms and actions that are aligned to the organisation's objectives and KPIs so that the needed changes can be specified and delegated to the right people to implement.</p> <p>Strategy innovativeness also means understanding what make your organisation differ from the rest of other public organisations with similar functions. What values can you offer to the publics from your organisation's objectives and functions and what are the strategic plans and actions needed to achieve them?</p> |

| POINT factor | User explanation and recommendation |
|---|--|
| <p>Factor 4 Workforce innovativeness</p> | <p>Workforce innovativeness refers to the organisation's workforce that are motivated and capable. Innovative workforce are committed to do their bests and take positive actions to further the organisation's interests in achieving its goals and serving the society, whilst capable and talented with the right skills and expertise required for their jobs.</p> <p>Innovative public organisation supports life-long learning and invests in activities that support the progresses and developments of its employees towards current and future roles.</p> <p>Innovative, motivated and talented workforce are keys to the success of innovative organisation. Employees will be motivated to deliver the best results in their jobs if their hard work and achievements are justly recognised and appreciated.</p> |
| <p>Factor 5 Resources & Infrastructure innovativeness</p> | <p>Resources & Infrastructure innovativeness refers to the ability of the organisation to allocate, leverage, and maximize its resources and intellectual capital such as budgets and funds, ICT investments, e-government, investment in R&D, and accumulated knowledge to create innovation, new knowledge, and improve efficiencies and performance of the organisation.</p> <p>Having sufficient resources and good infrastructure of ICT are essential in fostering innovation. You can improve your organisation's resources & infrastructure innovativeness by assigning specific budgets or people dedicated to continually improve the operations and internal processes, investing in in-house R&D that effectively produce new knowledge and innovative results, providing good quality, fast, and secure internet and wireless</p> |

| POINT factor | User explanation and recommendation |
|---|---|
| | <p>connections to all employees at all times, and make full use of available information and communication technologies, social media platforms, and mobile phone applications to improve daily operations and widen public engagement.</p> |
| <p>Factor 6 Management innovativeness</p> | <p>Management innovativeness in public organisations refers to the capability and practice of the organisation management team in using new public management approaches, knowledge management, organisational learning, and absorptive capacity to improve innovation processes, exploit human capital and resources, challenge the existing structure and framework conditions within the organisations in order to be more productive and improve services.</p> <p>Management innovation is innovation in management principle and processes that ultimately changes the practices of what managers do and how they do it.</p> <p>Managers need to think of how to improve and manage new ideas, implement new practices, and diffuse what works within the organisations. If some operations or processes are already accepted as common rule or practices, there should be manual or written instruction for employees to refer to. Knowledge management system such as intranet database also helps knowledge sharing, diffusion, and learning.</p> <p>If you are a manager, can you provide insight knowledge and feedback to help identify potential opportunities and eliminate problems? If you are human resources manager, can you train, make use, and retain talented or high-performing employees?</p> |

| POINT factor | User explanation and recommendation |
|---|--|
| <p>Factor 7 Performance innovativeness</p> | <p>Performance innovativeness can be measured based on how the outputs and outcomes of the projects and services of the organisation are handled and monitored in order to achieve the organisation targets and goals.</p> <p>Innovative organisations are high performers with results and effective operations that outperform their peers. They need reliable and efficient output management monitoring and evaluation system that can incorporate performance indicators effectively into day-to-day operations and update when necessary to reflect changing national policies, strategic agendas and solving social problems.</p> <p>Does your organisation consistently achieve its annual targets and KPIs? Does your organisation use reliable and efficient performance monitoring and evaluation system? Benchmarking your outputs with peer organisations in the same country and globally can help position the targeted deliverables and improve your organisation performance.</p> |
| <p>Factor 8 Networks & External contexts innovativeness</p> | <p>Networks & External contexts innovativeness refers to utilisation of collaborative networks and alliances, and leverage of favorable policy, political and legislative conditions for innovation to improve the outputs and performance of the organisation. National and international collaborative networks with other public agencies, private sector and academia can enhance innovative capability and help shared resources to achieve the desirable outcomes. External contexts can interfere with how the organisation handles its innovation processes and implementations and can be both drivers and barriers to organisational innovativeness depending on how the circumstances are managed.</p> |

| POINT factor | User explanation and recommendation |
|--------------|--|
| | <p>Innovation is the outcome of interactions among multiple actors and institutions. Innovative public organisations benefits from collaborative networks with other actors by having access to and sharing of best practices, capabilities, and knowledge that enhance their performance and competitiveness.</p> <p>Government policies, laws, regulations, and political mandates and climates can help foster innovation in your organisation by assisting in forming new organisational initiatives and subsidiaries such as spin-off and spin-out agencies that can better serve new innovative objectives and bring new values to the public.</p> |

6.5 Program system support development and user webpage interface design of POINTinno.com

6.5.1 Server backup system architecture and program operating environment

The server backup system architecture of POINTinno.com online web-based application is deployed in mirror scheme using 2 synchronized main and backup machines. In case of malfunction of the main machine, the backup machine will serve the workload instead of another one seamlessly. The program server operating environment stacks use Linux OS operating system, Apache webserver, MySQL database server and PHP interpreter.

Each server-client connection is communicated over Transport Layer Security (TLS) protocol to ensure security. This system is based on client-server architecture that requires stable internet connection in order to work properly on the following internet browsers:

Mozilla Firefox version 25.0.0 or newer.

Google Chrome version 31.0.0 or newer.

Apple Safari version 5.1.7 or newer.

POINTinno.com online web-based application was also developed to be compatible to view in both desktop and mobile phone displays.

6.5.2 User webpage interface design of POINTinno.com

The main homepage URL link is <http://www.POINTinno.com> and the snapshot of the actual main page of POINTinno.com application is shown in Figure 6.4 below.

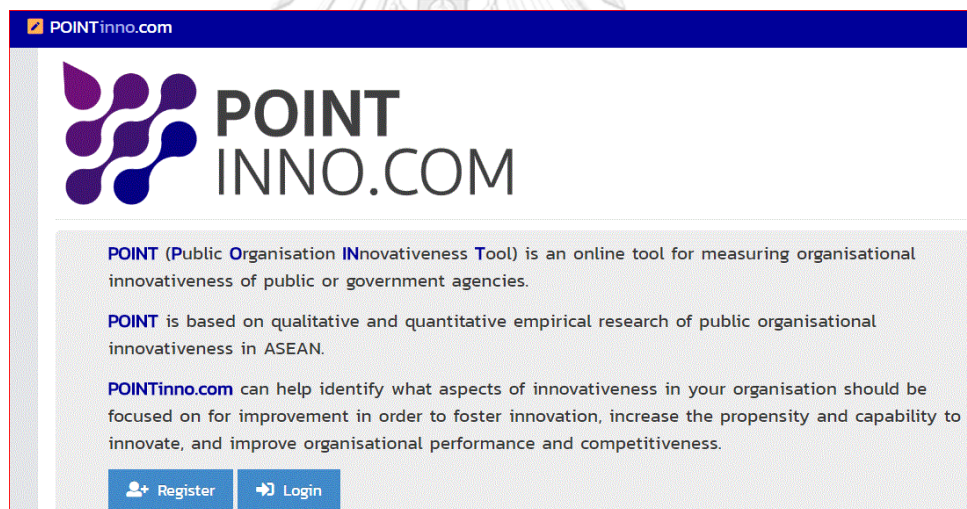


Figure 6.4: Main homepage of POINTinno.com

The user webpage interface design of POINTinno.com can be described based on the sequences of frontend (Figure 6.5) and backend diagrams (Figure 6.6) as shown in this section. The full details and snapshots of the all of the pages of POINTinno.com are shown in Appendix 7.

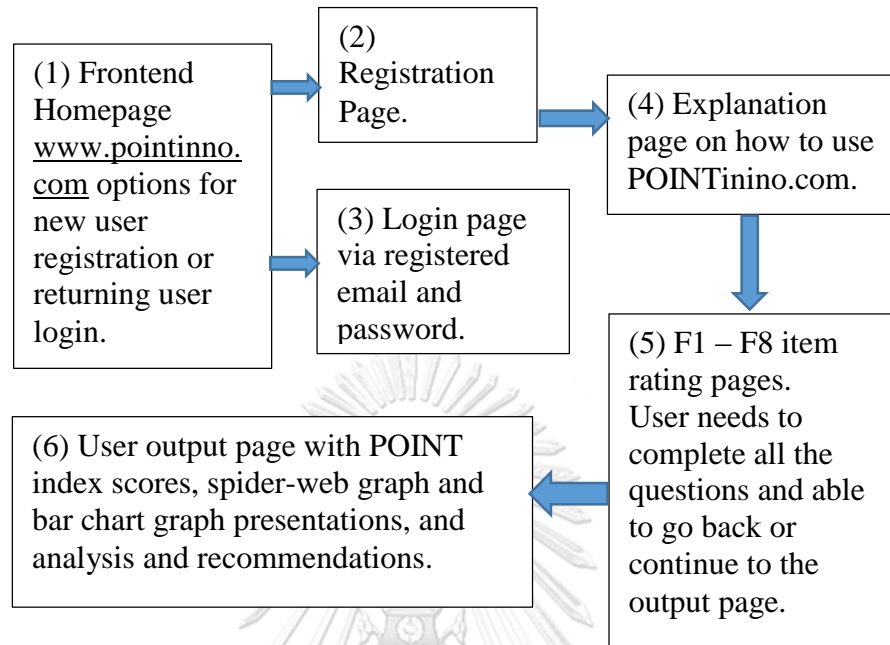


Figure 6.5: Frontend user interface diagram

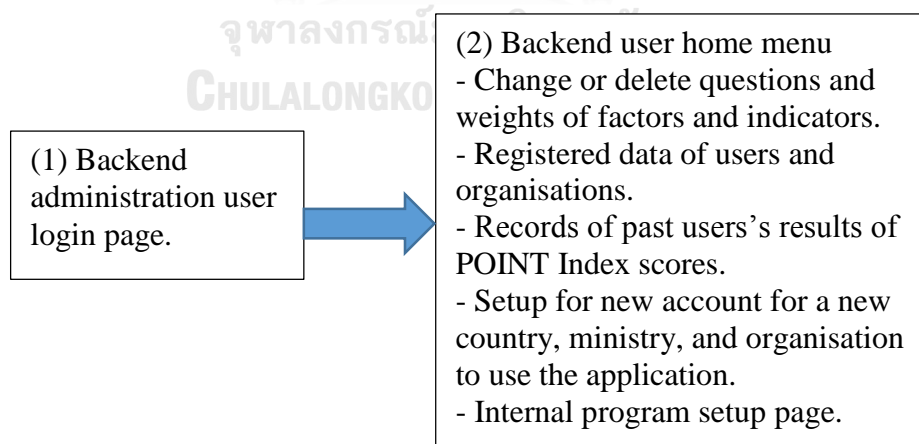


Figure 6.6: Backend user interface diagram

In Figure 6.5: Frontend user interface diagram, invited users can go to <http://www.POINTinno.com> to assess the main homepage. The user sequence processes of using POINTinno.com are described as follows.

- (1) First time users need to register in order to use POINTinno.com by providing their name, organisation, and email address with chosen password. Returning user can login via their registered email address. Registered user with a validate email address will have their corresponding organisation under the pre-determined ministry and country associated with their email address in order to automatically assign the user to their correct organisation records.
- (2) User explanation page with the instruction on how to use POINTinno.com to measure their organisational innovativeness by rating of scale of 1.0 – 5.0 from strongly disagree to strongly agree with the provided statements to reflect the current situation of their organisation.
- (3) Eight pages of POINT factors, one page per factor with the item statements starting from F1: Culture Innovativeness to F8: Networks and External Contexts Innovativeness, for users to rate their OI. The slide bar design is provided for users to select the scale that they want in a 0.1 interval. Users can also type directly on top of the default starting value of 3.0 to change to the required rating of their choice. Users can choose to read the item statements in Thai or English. Back and next buttons are provided for users to choose to go back to the previous factor page to change the rating scores or continue to the next page until finish to F8. If one item is missed, prompt message will come up to remind user to select a score.
- (4) After completing all the items in F8, the user output page will come up with spider web graph presentation to compare the overall POINT Index Scores at organisational, national, and ASEAN average. The application also informs users of the results of their own POINT Index

Scores in comparison to other users who have rated their organisation in the past three years in bar chart graphical presentation. The program automatically selects one of the five OI levels according the overall score obtained along with the corresponding user explanation and recommendation message in Table 6.9. The eight factors of POINT model in Table 6.10 also explain what each factor of OI represents and what can the user do to improve their OI. The in bar chart graphical presentation.

In Figure 6.6: Backend user interface diagram, the backend user sequence processes of using POINTinno.com are described as follows.

- (1) The administrator user can login at the homepage of POINTinno.com with the registered administrative email address and password in order to access the backend user menu.
- (2) The backend home menu was setup with the five supporting features for the administrator to be able to 1) adjust, delete, or add the input factors and item wordings along with their weighted sum percentage contributions to the overall POINT Index Score; 2) pull out the record of users who have registered to use the application; 3) the past records of the previous POINT Index Scores of the registered organisations and ministries; 4) Input entry of the name of the organisation for the user to select from the pre-determined drop-down menu; and 5) Background program setup regarding user and organisation data information.
- (3) Each of the five features as described previously will pull out the corresponding pages for the administrator to adjust or recall the required data with the options to save or disregard the latest changes and selected choices.

6.6 Pretesting and refinement before launch

The concept of the seven-step System Development Life Cycle (SDLS) was applied and utilised in this study in order to develop POINTinno.com online web-based application before launching and testing the user technology acceptance in Chapter 7. The pre-test was conducted with the programmers, website developers, and selected potential users in Thailand. The SDLS processes can be described as follows:

Step 1: Planning

The purpose of the application to measure OI, desirable features and functions, as well as the timeline to develop POINTinno.com were discussed with professional webpage designer and developer. The work scope and development budget were planned out and agreed upon with the contract signing at this stage.

Step 2: Analysis and requirement

Various options on how POINTinno.com internal automatic program should be setup in order to properly measure and compare OI of public agencies at different levels of country, ministry, and organisation under a ministry were analysed. The selected final option was to create the backend features and functions for the administrator user to be able to have full control in adjusting the parameters, wordings, and weighted sum percentages of all the factors and indicators in POINT measurement model. The benefit of this option is that the owner or the administrator of POINTinno.com can choose to continue to improve and include new indicators and average POINT factor scores for comparison in the future.

Step 3: System design

Following Step 2, the required functions of the operating system and webpage design were created via mock-up pages. The logo, theme, and colours of POINTinno.com were developed at this stage. The use of spider web graph to present and compare different levels of POINT factor scores as well as the speed meter dial presentation of each factor of POINT were develop at this phase.

Step 4: Development

POINTinno.com was developed based on the specifications and agreed design features from the previous steps. Additional recommendation of user output feature to display the bar chart to keep track records of POINT Index Scores for the last three years was added at this step.

Step 5: Testing

All the relevant features and functions of POINTinno.com were tested to ensure that they can work smoothly and correctly calculate and compare the POINT Index Scores at different levels. The user output page of recommendations with PDF file printout and option to send the results to the users' email address were also tested at this stage.

Step 6: Implementation or pre-launch

POINTinno.com was pre-launched online at the pre-booked URL address www.pointinno.com.

Step 7: Maintenance after launch

Maintenance after launch of POINTinno.com was agreed to cover the next five years period including hosting of the server, backup data, and automatic email confirmation for new user registrations.

CHAPTER 7

USER ACCEPTANCE TEST AND COMMERCIALISATION POTENTIAL ASSESSMENT

In this chapter, the target user technology acceptance test results are presented and analysed in order to assess the commercialisation potential of POINTinno.com online web-based application to measure OI according to the Research Objective No. 4.

The concept of Technology Acceptance Model (TAM) (David & Venkatesh, 1996) is adapted and utilised by including the item statements of the factors that are believed to affect the users' intention to use a new technological product in the questionnaire survey. These factors are the perceived usefulness, perceived ease of use, and behavioural intention to use. The target users were from public organisations in Thailand, Malaysia, and Philippines.

The commercialisation potential of POINTinno.com is then assessed based on the intellectual property management analysis and the feasibility analysis of market, technical, operational, and financial feasibilities.

7.1 User acceptance test

The potential target public organisations in the ASEAN COST networks were contacted and inquired whether they would be interested in testing POINTinno.com to measure and compare their organisational innovativeness with other public organisations in ASEAN. The organisations that replied and agreed to participate in the user acceptance test were from Thailand (STI Office and NSTDA), Malaysia (SBC), and Philippines (DOST). The total number of potential users that tested POINTinno.com application and completed the user acceptance survey was $n=25$ respondents (14 from STI Office, 3 from NSTDA, 5 from SBC, and 3 from DOST).

The online questionnaire survey was created and the URL link of the online survey was sent to the participants who had used POINTinno.com and agreed to participate in the survey. The online questionnaire of user acceptance survey is shown in Appendix 7.

7.1.1 Demographic results of the users

The demographic results of the users are shown in Table 7.1.

Table 7.1 Demographic results of the users (n=25)

| User demographic | Number | Percentage |
|--|--------|------------|
| Organisations | | |
| Sarawak Biodiversity Centre (SBC), Malaysia | 5 | 20.0 |
| Department of Science and Technology, (DOST), Philippines | 3 | 12.0 |
| National Science and Technology Development Agency, (NSTDA) Thailand | 3 | 12.0 |
| National Science Technology and Innovation Policy Office, (STI) Thailand | 14 | 56.0 |
| Total | 25 | 100.0 |
| Gender | | |
| Male | 11 | 44.0 |
| Female | 14 | 56.0 |
| Total | 25 | 100.0 |
| Age of users | | |
| Below 25 years old | 1 | 4.0 |
| 25-35 years old | 10 | 40.0 |
| 36-45 years old | 11 | 44.0 |
| 46-55 years old | 3 | 12.0 |
| 56-65 years old | 0 | 0.0 |
| More than 65 years old | 0 | 0.0 |
| Total | 25 | 100.0 |
| Current position | | |
| Top executive director, deputy director, or equivalent | 3 | 12.0 |

| User demographic | Number | Percentage |
|---|--------|------------|
| Middle management | 5 | 20.0 |
| Senior employee | 14 | 56.0 |
| Junior employee | 2 | 8.0 |
| Student/ Training | 1 | 4.0 |
| Total | 25 | 100.0 |
| Number of years in current position | | |
| Less than 1 year | 1 | 4.0 |
| 1-3 years | 8 | 32.0 |
| 4-6 years | 10 | 40.0 |
| More than 6 years | 6 | 24.0 |
| Total | 25 | 100.0 |
| Number of years working in the organisation | | |
| Less than 1 year | 1 | 4.0 |
| 1-5 years | 7 | 28.0 |
| 6-10 years | 12 | 48.0 |
| 11-20 years | 4 | 16.0 |
| More than 20 years | 1 | 4.0 |
| Total | 25 | 100.0 |
| Highest education qualification | | |
| Ph.D. | 9 | 36.0 |
| Master's degree | 15 | 60.0 |
| Bachelor's degree | 1 | 4.0 |
| Below Bachelor's degree | 0 | 0.0 |
| Total | 25 | 100.0 |
| Areas of expertise and formal qualifications | | |
| Science, technology, engineering, and mathematics (STEM) | 25 | 100.0 |
| Healthcare and medicine | 0 | 0.0 |
| Industry, trading, and manufacturing | 0 | 0.0 |
| Education and teaching | 0 | 0.0 |
| Economy, finance, and accountancy | 0 | 0.0 |
| Management and business administration | 6 | 24.0 |
| Politics and public policy | 2 | 8.0 |
| Laws and security enforcement | 0 | 0.0 |
| Social studies (including arts, culture, history, sports, media, and entertainment) | 0 | 0.0 |
| Other (please specify) | 0 | 0.0 |
| Total | 25 | 100.0 |

The demographic results of users in Table 7.1 show that most users (14 responses, 56%) were from National STI Policy Office, Thailand, followed by Sarawak Biodiversity Centre (5 responses, 20%), and DOST and NSTDA (3 responses each, 12%). Most users were female (14 responses, 56%), ages between 36-45 years old (11 responses, 44%), senior employees (14 responses, 56%), had been in their current position for 4-6 years (10 responses, 40%), had been with the organisation for 6-10 years (12 responses, 48%).

Most of the responders had Master's degree as highest qualification (15 responses, 60%), and all of them (25 responses, 100%) had expertise and formal qualifications in science, technology, engineering, and mathematics (STEM).

7.1.2 Previous experience of users in using other programs or tools

Users were asked in the survey whether they have used any programs to measure and manage innovation or innovativeness. The rationale was that users who have used other programs should be able to compare POINTinno.com with those programs and may affect the decision whether to use POINTinno.com. The results are shown in Table 7.2 below.

Table 7.2: Previous experience of users in using other programs or tools to measure innovation or innovativeness

| User Experience | Number | Percentage |
|---|--------|------------|
| Have you ever used any programs, software, or tools apart from POINTinno.com to measure or manage innovation or innovativeness? | | |
| Yes, I have. | 7 | 28.0 |
| No, I have not. | 18 | 72.0 |
| If answer yes, please provide the names of the programs or tools. | 5 | 20.0 |
| Does your organisation use any programs, software, or tools to measure or manage innovation or innovativeness? | | |
| Yes. | 4 | 16.0 |
| No | 21 | 84.0 |
| If answer yes, please provide the names of the programs or tools | 3 | 12.0 |

The results in Table 7.2 show that 72% (18 responses) had never used other programs or tools to measure innovation or innovativeness and 84% (21 responses) said that their organisation did not use any programs or tools to measure innovation or innovativeness.

Among the users who answered that they had used other programs or tools, the names of those software or tools were balanced scorecard, open2-innov8ion, and in-house program by the HR department.

7.1.3 User acceptance of POINTinno.com based on TAM

The results of the user acceptance test of POINTinno.com based on the TAM factors are shown in Table 7.3.

Table 7.3: Results of user acceptance of POINTinno.com

| No. | Users' acceptance of POINTinno.com | Mean | SD. | Mean level |
|------------------------------|---|-------------|--------------|---------------|
| Perceived Usefulness | | | | |
| U01 | The results of POINT Index Scores and the level of organisational innovativeness are useful for me and my organisation | 4.24 | 0.723 | V.High |
| U02 | POINTinno.com can effectively measure and compare different aspects of organisational innovativeness. | 4.08 | 0.702 | High |
| U03 | This online tool can help assist leaders and managers to improve organisational performance and competitiveness. | 4.16 | 0.800 | High |
| U04 | This online tool can help determine what areas of innovativeness should be improved. | 3.76 | 0.723 | High |
| | Average Perceived Usefulness | 4.06 | 0.750 | High |
| Perceived Ease of Use | | | | |
| U05 | The instruction on how to use the online tool is clear and easy to follow. | 4.28 | 0.737 | V.High |
| U06 | The recommendations on how to improve innovativeness are clear and possible to be implemented. | 3.84 | 0.850 | High |
| U07 | The method to measure organisational innovativeness by average user ratings and weighted sum score are simple to understand. | 4.16 | 0.688 | High |
| U08 | The slide bar option for item rating is well designed and user friendly. | 4.08 | 0.812 | High |
| U09 | This online tool can be easily accessed anywhere, anytime, from any devices. | 4.44 | 0.712 | V.High |
| U10 | This online tool can be used and compatible the standard software and operating system on my computer, tablet, or smartphone. | 4.60 | 0.577 | V.High |
| U11 | Overall this online tool is easy to use and does not require much of my effort. | 4.32 | 0.690 | V.High |
| | Average Perceived Ease of Use | 4.25 | 0.752 | V.High |
| Behavioural Intention to Use | | | | |
| U12 | This online tool can be used as part of my organisation strategic planning. | 4.00 | 0.764 | High |
| U13 | This online tool can be used as part of my organisation performance indicators. | 4.04 | 0.889 | High |
| U14 | I intend to use this online tool again in the future to compare my results with others. | 4.08 | 0.812 | High |

| No. | Users' acceptance of POINTinno.com | Mean | SD. | Mean level |
|-----|---|------|-------|------------|
| U15 | I think other staff in my organisation should use this online tool as well. | 3.96 | 0.790 | High |
| U16 | Overall, this online tool is suitable to be used in my organisation. | 3.92 | 0.759 | High |
| | Average Behavioural Intention to Use | 4.00 | 0.793 | High |
| | Overall Average User Acceptance | 4.12 | 0.771 | High |

The scores from 1.00 – 5.00 of user's acceptance of POINTinno.com can be arranged according to the following five categories.

| | |
|-------------|-----------|
| 1.00 – 1.80 | Very low |
| 1.81 – 2.60 | Low |
| 2.61 – 3.60 | Middle |
| 3.61 – 4.20 | High |
| 4.21 – 5.00 | Very high |

The results in Table 7.3: User acceptance of POINTinno.com based on the TAM factors show that the mean scores of user perceived usefulness factor were from 3.76 (SD. 0.723) high to 4.24 (SD. 0.723) very high, with the average of 4.06 (SD. 0.750) high.

The scores of user ease of use factor were from 3.84 (SD. 0.850) high to 4.44 (SD. 0.712) very high, with the average of 4.25 (SD. 0.752) very high.

The scores of user behavioural intention to use were from 3.92 (SD. 0.759) high to 4.08 (SD. 0.812) high, with the average of 4.00 (SD. 0.793) high.

The overall score of the average user acceptance of POINTinno.com was 4.12 (SD 0.771) which is in the high level, suggesting that the potential users believed that the application would be useful, easy to use, and intend to use in their organisation.

7.1.4 Subscription options and membership fees

The results of the subscription options for users are shown in Table 7.4.

Table 7.4: Results of subscription options for users

| Subscription options | Number | Percentage |
|--|--------|------------|
| Option 1: Non-membership limited access to the online tool within 1 year without expert consultation session. | 16 | 64.0 |
| Option 2: Membership subscription to the online tool for 1 year with unlimited access via a one-off subscription fee. Plus free consultation session with experts on how to improve various aspects of your organisation innovation and innovativeness. | 18 | 72.0 |
| Option 3: Membership subscription to the online tool for 3 years with unlimited access via a discount annual membership fee. Plus free consultation session with experts on how to improve various aspects of your organisation innovation and innovativeness. | 2 | 8.0 |
| Other options. Please recommend. | 0 | 0.0 |

The results of POINTinno.com user subscription options in Table 7.4 show that most of the users (18 responses, 72%) selected Option 2: one-year membership option with unlimited access and free consultation, followed by Option 1: Non-membership limited access within 1 year without expert consultation session with 16 responses or 64%. Only 2 users or 8% selected Option 3: Three-year membership subscription with unlimited access and free consultation session.

Table 7.5: Per access and membership subscription fees results

| Subscription options | Fees that users were willing to pay (Thai Baht) | | | | |
|----------------------|---|--------|--------|--------|--------|
| | Min | Max | Mean | Median | Mode |
| Per access | 2,000 | 33,000 | 10,111 | 6,750 | 5,000 |
| 1-year membership | 15,000 | 45,000 | 30,000 | 27,500 | 20,000 |
| 3-year membership | 70,000 | 90,000 | 80,000 | 80,000 | N/A |

In Table 7.5, the results of per access and membership subscription fees show that the mean average prices that the potential users were willing to pay to use POINTinno.com to measure their OI per access without consultation was 10,111 Baht, mean average 1-year membership fee with consultation was 30,000 Baht, and 3-year membership fee with consultation was 80,000 Baht.

For per access usage, the price range that users were willing to pay was 2,000 – 33,000 Baht. For 1-year membership option, the price range that users were willing to pay was 15,000 – 45,000 Baht. For 3-year membership option, the price range that users were willing to pay was 70,000 – 90,000 Baht.

However, the results were not normally distributed due to the wide range between the minimum and maximum values quoted by the users. Therefore, instead of the Mean average, the Mode average value of 5,000 Baht for per access fee and 20,000 Baht for 1-year membership fee will be used in the subsequent analysis of the commercialisation potential assessment. The lower values of per access and 1-year membership fees than the Mean and Median averages can also help entice more users to use POINTinno.com in their organisations.

7.2 Commercialisation potential assessments

In this section, commercialisation potential assessments of POINTinno.com as an online web-based application are analysed based on its IP management, market feasibility, technical feasibility, operational feasibility, and financial feasibility.

7.2.1 Intellectual property management analysis

The intellectual property (IP) of POINTinno.com online application includes the algorithm or computer software program that calculates the POINT Index Score based on user inputs. Software program is categorised as having copyright similar to art, literature, films, and music according to Thailand Copyright Act B.E. 2537 law.

The Copyright Act B.E. 2537 states that "computer program" is defined as instructions, set of instructions or any other matter, which are used with a computer in order to operate the computer or to generate an output, regardless of the computer language.

Under Part 4: Term of Copyright Protection, it states that the copy right protection for an author shall subsist for the lifetime of the author and for 50 years after his death. Where the author is a legal person (such as a company limited), the copyright shall subsist for 50 years as from the authorship. If the work is published during such period, the copyright shall subsist for 50 years from the first publication date.

POINTinno.com application was created during the course of Ph.D research study at Technopreneurship and Innovation Management Program, Graduate School, Chulalongkorn University. Therefore, a certain amount of copyright fee will have to be paid to Chulalongkorn University if the application can generate income and profit in the future.

The researcher intends to register a company limited with 3 ownerships including the researcher in order to commercialise and benefit from POINTinno.com application. The fourth ownership to benefit from the copyright belongs to Chulalongkorn University. Therefore, the maximum copyright ownership fee of 25% should be paid to Chulalongkorn University if there are profits gained from this work.

Nevertheless, it should be noted that this copyright fee of 25% payable to Chulalongkorn University is the maximum estimation based on the assumption of equal partnership in the company. In reality, the actual copyright fee can be negotiated and may be considerably lower than this estimation.

The licensing options of POINTinno.com can be described in the following three options.

Option 1: Non-Exclusive licensing

Non-exclusive licensing refers to the licensor ability to grant the use of the IP i.e. POINTinno.com online software application to any interested users or organisations by one-off per access usages or annual subscription memberships.

The company of the research is protected by the Copyright Act law in the next 50 years and able to continue to profit from POINTinno.com. The researcher can choose to cooperate with public organisations in ASEAN and negotiate for the sponsorship in exchange for the organisation to use the program for a certain period of time. The accumulated database can be used for academic, public policy, and commercialisation purposes. POINTinno.com will be more well-known and used by more public organisations as strategic decision support program.

This option requires more investments and additional costs to operate the company, to promote the program to the target users, and to manage and maintain the database and the server.

Option 2: Exclusive licensing

Exclusive licensing refers to making a contract for only one user or organisation to exclusively use the program. The researcher still maintains the copyright and ownership of POINTinno.com application in the next 50 years. The researcher and the company will receive the exclusive licensing fee from the contracted user or organisation to exclusively use the application for their organisation.

This option does not require additional cost to promote the application to other organisations. The option also give an opportunity to further assess how POINTinno.com can be used as a decision supporting tool to identify areas of OI to be improved over a longer period of time in one organisation (longitudinal assessment).

However, since the application will only be used for one organisation, internal database improvement by acquiring further inputs from other organisations in other countries ceases to exist. Apart from this, the application will not get to be used and gain wider recognitions by other organisations.

Option 3: Selling out

Selling out option refers to the case in which the copyright and the management of POINTinno.com are sold out to a buyer and the researcher is no longer involved in the application. In this case the researcher and the company receives one big payment for selling off the application to a user or an organisation to use and manage it. However, currently there is no buyer who have shown interest in buying the application outright.

The user acceptance survey results showed that POINTinno.com application received high acceptance by the potential users with the average score of 4.12 (SD. 0.771). Therefore, all of the three options of licensing should be possible.

However, at this point in time, the best option to commercialise POINTinno.com is via non-exclusive licensing option because there is no offer for the selling out option and the price for exclusive licensing option might be too high for the users to be interested to use the application. Since most potential users preferred per access and one-year membership with consultation, the researcher selected this method of promoting the application. As a result, the subsequent financial feasibility analysis was conducted by exploring the non-exclusive licensing IP management option.

7.2.4 Market feasibility

Market feasibility of POINTinno.com as an online web-based application to measure and compare organisational innovativeness of public organisations are discussed based on the current market conditions, competitive environment based on Porter's Five Forces model, and marketing strategy based on the 4C concept.

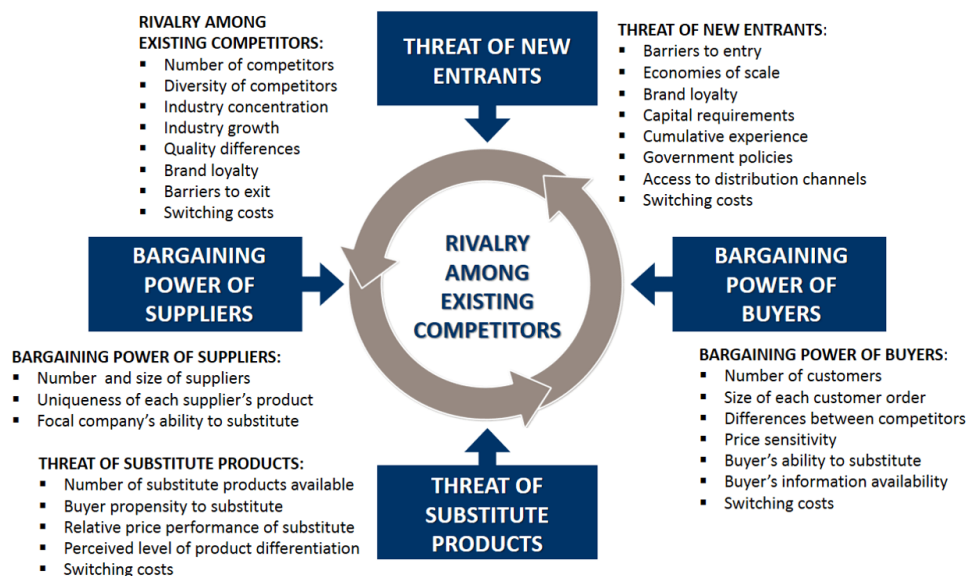


Figure 7.1: Porter's five forces model

(Source: <https://www.business-to-you.com/porters-five-forces/>)

The current market conditions of online application to measure organisational innovation and innovativeness are growing especially in the government sector that is catching up with the private sector along with the support from the government policies in promoting Thailand 4.0 and emphasizing the government roles in supporting startups and new entrepreneurs. Innovation is also part of the ASEAN member countries' government plans to improve competitiveness and raise economic advantages. Therefore, ASEAN public organisations require effective tools and programs such as POINTinno.com to assist in strategic planning in order to be more innovative and increase performance.

The competitive environment based on Porter's Five Forces model in Figure 7.1 is analysed as follows:

1. Threats of new entrants

Threats of new entrants of programs or software applications to measure organisational innovativeness in ASEAN are still quite low at present since POINTinno.com was the first formal attempt in ASEAN COST networks based on the qualitative interview results. However, new government policies in promoting better performed and more innovative public organisations may result in future products or studies to systematically measure and compare organisational innovativeness across ASEAN that could be rivals to POINTinno.com.

2. Threats of substitute products

Threats of substitute products are from in-house programs based on existing software such as Excel and balanced scorecards that were developed for specific purposes to manage and monitor organisational goals and KPIs. However, to convert these products into providing features that can compare the levels of organisational innovativeness to other agencies at the national and ASEAN average levels require the database that can only be accumulated from research studies. Other threats of substitute products are from the applications and programs developed for private companies and strategic consultancy firms.

3. Power of suppliers

Power of suppliers in the case of software development refers to the programmers, website designers, and online server service providers and there are many companies available to collaborate with and choose from in order to improve the desirable features of POINTinno.com in the future.

4. Power of customers

The main target customers are users from public organisations in Thailand and other ASEAN member countries that are currently seeking to improve their organisational innovativeness. The customers may have relatively high bargaining power to begin with as they are not familiar with using the application and scheduled consultation sessions are needed to promote how the application can help users compare and measure organisational innovativeness.

5. Competitive rivalry

There are some software applications to measure individual innovativeness tendencies such as open2-innov8ion but none of them offers to compare specific areas of organisational innovativeness in details at the national and regional levels as available in POINTinno.com.

7.2.2 Marketing strategy

Marketing strategy on how to promote POINTinno.com can be analysed based the Marketing Mix 4Cs which is a modern version of the 4Ps (Product, Price, Place, and Promotion) that are more focusing on the customer's point of view of why they will need to use the product. The Marketing Mix 4Cs and 4Ps are shown in Figure 7.2 below.

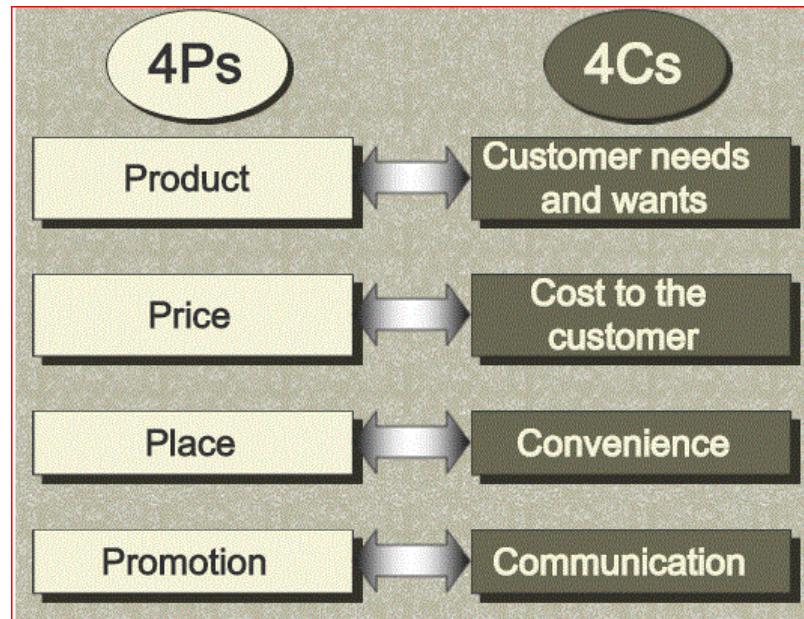


Figure 7.2: Marketing Mix 4Cs and 4Ps

Product & Customer needs

POINTinno.com is considered a new product in Thailand and ASEAN for measuring OI in public organisations that was tailored-made based on the empirical research and database of the eight factors of OI. Therefore, this application was developed to answer the need of public organisations in ASEAN to measure and compare OI in order to strategically put resources and focus in improving OI in selected areas with POINT Index scores lower than the national and ASEAN averages. Further improvements of the application can be done in the future along with user consultations in order to improve OI of the user organisations based on the required specific areas.

Price and cost

The Mode average per access price to use POINTinno.com from the survey was 5,000 Baht and the one-year membership fee with consultation was 20,000 Baht. To gain more support and loyalty from the target public organisations, these prices may also include the offer to put up the official logos of these public organisations as sponsors on the main website of POINTinno.com. This strategy can also help other

subsequent new users to feel more confident in using the application as their decision support system if they see that other agencies and ministries have officially endorsed and used the program.

The per access fee of 5,000 Baht can be charged to the potential organisations for the initial demonstration session on how to use of POINTinno.com to measure and compare OI. The same user organisations can be charged for the 1-year membership fee of 20,000 Baht if they agree to use POINTinno.com as a strategic decision support application.

Place and convenience

The official website www.pointinno.com is the main channel that potential users can check out the information of how the application can be an important tool in improving OI.

Make use of social media and other online channels to promote POINTinno.com to wider public and target organisations.

Promotion and communication

Promote the application in the official meetings of ASEAN COST and other meetings of public organisations in ASEAN to gain more recognition among the potential target public agencies.

Prepare visual displays and printouts to promote POINTinno.com at other events or exhibitions where many ASEAN public agencies attend.

Direct marketing approach can be used to promote POINTinno.com by contacting top executives of the target public organisations and public universities to pitch the features and usefulness of the application in identifying the specific areas to improve OI.

7.2.3 Operational feasibility

The commercialisation of POINTinno.com will be operated via company limited style because this will increase the trustworthiness in dealing with the potential customers in public organisations and public universities in Thailand and ASEAN countries, which are the main target users of the application. Setting up and registered a company will also allow more potential investors to join and invest in this venture.

Apart from this, since 2017 there are tax benefits for company limited that has registered authorized capital less than 5 million Baht and has income less than 30 million Baht including:

- Tax exemption for the profit less than 300,000 Baht
- 15% tax rate for the profit from 300,000 – 3,000,000 Baht
- 20% tax rate for the profit above 3,000,000 Baht.

If a company makes a loss, the company can claim the amount loss as the company expenses for 5 financial years. (Source: <https://www.kasikornbank.com/th/business/sme/>).

The organisation structure to commercialise POINTinno.com application consists of the researcher, website developer, and external investment partner. The duties of the researcher are to contact new customers, maintain customer relations, and promote the application, whilst the duties of the website developer are the maintenance of the program, website, and server.

The laws and regulations both in Thailand and abroad that are relevant to the operation of POINTinno.com that should be considered include:

- Civil and Commercial Code laws
- Accounting Act, B.E. 2543 (2000)
- Accounting and auditing regulations
- Corporate Income Tax laws and regulations
- Online data protection laws and regulations
- E-commerce laws and regulations

BOI Measures and incentives for tax deduction of R&D expenditures
Government procurement laws and regulations in Thailand and in ASEAN

POINTinno.com company limited needs to follow the laws and regulations mentioned above in order to ensure successful company operation and management.

7.2.4 Technical feasibility

The application is ready to use with the server backup and homepage website online for 24 hours access. The backend root user functions and content management were developed so that the pre-input factors, item statements, weights, user and organisation login information, average national and ASEAN scores, and user recommendation printout page can be updated when necessary at any time. The database of the users and reports of the POINT Index scores are also kept in the server database backup so that they can be utilised as necessary if required in the future.

7.2.5 Financial feasibility

Financial feasibility analyses the degree to which a project is financially possible and attractive to potential investors by considering the payback period of the investment, Net Present Value (NPV), and Internal Rate of Return (IRR) on investment. The initial investment in developing POINTinno.com and its yearly costs to improve and maintain the program and its server are estimated.

The financial statements covering the income statement, cash flow, total assets, and accounting balance sheet or statement of financial position are calculated in order to determine the payback period of the investment, NPV, and IRR of POINTinno.com online web-based application.

7.2.5.1 Initial investment and yearly operation cost

The initial investment and the estimation of the yearly operation cost of setting up and running a company limited to commercialise POINTinno.com application are shown in Table 7.6 and Table 7.7 respectively.

Table 7.6: Initial investment

| No. | Initial investment | Thai Baht |
|-----|--|-----------|
| | <i>Initial Investment</i> | |
| 1 | Programmer and webpage developer hiring | 80,000 |
| 2 | URL purchase and 5-year server maintenance | 20,000 |
| 3 | Company registration cost | 10,000 |
| 4 | Computer purchase and other office equipment | 40,000 |
| | <i>Total initial investment</i> | 150,000 |

Table 7.7: Yearly operating cost estimation

| No. | Yearly Operating Cost | Thai Baht |
|-----|---|---------------|
| | <i>Yearly Operation Costs</i> | |
| 1 | Cost of improving program, database, and webpage | 30,000 /year |
| 2 | Traveling costs to promote POINTinno.com in ASEAN (5 countries x 20,000 Baht per trip) and in Thailand (10 org. x 2,000 Baht = 20,000 Baht) | 120,000 /year |
| 3 | Product promotion and printing materials (15 units x 1,000 Baht per unit) | 15,000 /year |
| 4 | Office utility cost | 15,000/year |
| 5 | Staff salary | 180,000/year |
| | <i>Total yearly operation costs</i> | 360,000 /year |

7.2.5.2 Annual income and expenditures estimation

The sources of income are estimated from 1) per access unit sales for trials and test runs which utilise the Mode average value of 5,000 Baht obtained from the user acceptance survey, and 2) one-year membership fee plus consultation service which had the Mode average value of 20,000 Baht obtained from the user acceptance survey.

The number of public organisation estimated to be using POINTinno.com application in Year 1 is 10 organisations in Thailand and 5 organisations in ASEAN, Year 2 is 20 organisations in Thailand and 5 organisations in ASEAN, Year 3 is 30 organisations in Thailand and 5 organisations in ASEAN, Year 4 is 40 organisations in Thailand and 5 organisations in ASEAN, and Year 5 is 50 organisations in Thailand and 5 organisations in ASEAN as shown in Table 7.8.

The user per access fee of 5,000 Baht can be charged to the potential organisations for the initial demonstration session on how to use of POINTinno.com to measure and compare OI. The same user organisations can be charged for the one-year membership fee of 20,000 Baht if they agree to use POINTinno.com as a strategic decision support application for their organisation.



Table 7.8: Annual income estimation from per access and one-year membership fees of POINTinno.com application

| Sales and revenue generation | Year 1 2019 | Year 2 2020 | Year 3 2021 | Year 4 2022 | Year 5 2023 |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|
| Per access fees (Baht)/unit For trails or test runs | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Unit sales for per access | | | | | |
| Public orgs. in Thailand | 10 | 20 | 30 | 40 | 50 |
| Public orgs. in ASEAN | 5 | 5 | 5 | 5 | 5 |
| Total unit sales for per access | 15 | 25 | 35 | 45 | 55 |
| Sales A: Total income from per access sales (Baht) | 75,000 | 125,000 | 175,000 | 225,000 | 275,000 |
| One-year membership fee/unit with consultation (Baht) | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Unit sales for one-year membership | | | | | |
| Public orgs. in Thailand | 10 | 20 | 30 | 40 | 50 |
| Public orgs. in ASEAN | 5 | 5 | 5 | 5 | 5 |
| Total unit sales for one-year membership | 15 | 25 | 35 | 45 | 55 |
| Sales B: Total income from one-year membership (Baht) | 300,000 | 500,000 | 700,000 | 900,000 | 1,100,000 |
| Sales A + Sales B Total Income before Tax | 375,000 | 675,000 | 870,000 | 1,125,000 | 1,375,000 |

Table 7.9: Proforma profit & loss statement of POINTinno.com

| | Year 1 2019 | Year 2 2020 | Year 3 2021 | Year 4 2022 | Year 5 2023 |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|
| Incomes | | | | | |
| Income from sales | 375,000 | 675,000 | 870,000 | 1,125,000 | 1,375,000 |
| Total income before Tax | 375,000 | 675,000 | 870,000 | 1,125,000 | 1,375,000 |
| Expenses | | | | | |
| Travel expense in Thailand | 20,000 | 40,000 | 60,000 | 80,000 | 100,000 |
| Travel expenses in ASEAN | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 |
| Cost of development, improving program & database | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| Promotion and printing costs | 15,000 | 25,000 | 35,000 | 45,000 | 55,000 |
| Office utility | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| Staff salary | 180,000 | 180,000 | 180,000 | 180,000 | 180,000 |
| Depreciation | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| Amortization | 22,000 | 22,000 | 22,000 | 22,000 | 22,000 |
| Total expenses | 240,000 | 250,000 | 260,000 | 270,000 | 280,000 |
| Profit before 25% IP copyright deduction to Chulalongkorn | 135,000 | 425,000 | 610,000 | 855,000 | 1,095,000 |
| 25% IP copyright deduction to Chulalongkorn | 33,750 | 106,250 | 152,500 | 213,750 | 273,750 |
| Profit before tax | 101,250 | 318,750 | 457,500 | 641,250 | 821,250 |
| Tax deduction (20%) | 0 | 3,938 | 22,500 | 47,813 | 72,563 |
| Net profit | 101,250 | 314,813 | 435,000 | 593,438 | 748,688 |

Table 7.10: Cash flow estimation of POINTinno.com

| Cash flow | Year 0 2018 | Year 1 2019 | Year 2 2020 | Year 3 2021 | Year 4 2022 | Year 5 2023 |
|-----------------------------------|-----------------|----------------|----------------|----------------|------------------|------------------|
| Net profit | 0 | 101,250 | 314,813 | 435,000 | 593,438 | 748,688 |
| Depreciation | 0 | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| Amortization | 0 | 22,000 | 22,000 | 22,000 | 22,000 | 22,000 |
| Net cash flow from operation | 0 | 131,250 | 344,813 | 465,000 | 623,438 | 778,688 |
| Initial investment | -150,000 | 0 | 0 | 0 | 0 | 0 |
| Net cash flow | -150,000 | 153,250 | 366,813 | 487,000 | 645,438 | 800,688 |
| Accumulative Net cash flow | -150,000 | 3,250 | 370,063 | 857,063 | 1,502,500 | 2,303,188 |

7.2.5.3 Financial analysis of payback period, NPV, and IRR

Part 1: Payback period

The initial investment to develop POINTinno.com application was 150,000 Baht as shown in Table 7.6. The estimation of yearly operating cost of the company limited was 360,000 as shown in Table 7.7. The payback period can be calculated from the net cash flow estimation from Table 7.10.

The first year net cash flow is estimated to be 153,250 Baht in 12 months or $153,250/12 = 12,770.83$ Baht per month

The payback period in months can be calculated by dividing the initial investment of 150,000 by the estimated net cash flow per month.

Therefore, the payback period is $150,000/12,770.83 = 11.75$ months or approximately 12 months.

Part 2: Net Present Value (NPV)

NPV is a method of determining the current value of all future cash flows generated by a project after accounting for the initial capital investment. It is widely used in capital budgeting to establish which projects are likely to turn the greatest profit (www.investopedia.com).

$$\text{NPV} = (\text{C for Period 1} / (1 + R)^1) + (\text{C for Period 2} / (1 + R)^2) \dots (\text{C for Period } x / (1 + R)^x) - \text{Initial Investment.}$$

Where C is the expected cash flow per period,

R is the required rate of return, and

T is the number of periods over which the project is expected to generate income.

R = 10% is often used as the baseline rate when the specific target rate is not known.

Therefore, NPV for POINTinno.com project can be calculated by using the estimated net cash flow over the next five years in Table 7.10.

$$\text{NPV} = 153,200/(1+0.10)^1 + 366,813/(1+0.10)^2 + 487,000/(1+0.10)^3 + 645,438/(1+0.10)^4 + 800,688/(1+0.10)^5 - 150,000$$

Therefore, NPV of the POINTinno.com is 1,596,366 Baht or approximately 1.60 million Baht.

Part 3: Internal Rate of Return (IRR)

IRR represents a discount rate that makes the NPV of all cash flows from a particular project equal to zero. IRR is sometimes referred to as 'economic rate of return' or 'discounted cash flow rate of return.' The use of internal refers to the omission of external factors, such as the cost of capital or inflation, from the calculation (www.investopedia.com).

IRR can be calculated from the NPV formula by finding the interest value for the NPV to be zero using the Excel formula as shown in Table 7.11.

Table 7.11: Calculation of IRR of POINTinno.com project

| Year | Net Cash Flow | Present Value | Present Values for IRR | Rate of Return |
|---------------|---------------|---------------|------------------------|----------------|
| 0 | -150,000 | -150,000 | -150,000 | 10% |
| 1 | 153,250 | 139,318 | 56,854 | 170% |
| 2 | 366,813 | 303,151 | 50,485 | |
| 3 | 487,000 | 365,890 | 24,866 | |
| 4 | 645,438 | 440,842 | 12,226 | |
| 5 | 800,688 | 497,164 | 5,627 | |
| NPV Summation | | 1,596,365.76 | 58.88 | |

The results in Table 7.11 show that when the rate of return = 170%, NPV value gets close to zero. Therefore, the IRR of this project can be estimated at 170%.

However, the main assumption here is that the estimated number of annual unit sales are met and the income and revenue are generated as planned. Given that all the conditions are met, POINTinno.com project is considered a very good investment due to a relatively short payback period (12 months), high NPV value (1.60 million Baht) and high rate of IRR (170%).

CHAPTER 8

CONCLUSIONS AND DISCUSSIONS

The obtained results are concluded and discussed in this Chapter based on the four main research objectives. Cross-comparisons and analysis of the factors affecting public organisational innovativeness and their underlying relationships are discussed based on the empirical qualitative and quantitative findings. The limitations of the research are discussed. The implications and recommendations for future research are suggested. Summarised conclusions of the results based on the four research objectives are shown in Table 8.1.

**Table 8.1: Summarised conclusions of the results
based on the research objectives**

| Objectives | Results & Outputs |
|--|--|
| 1) To review how organisational innovativeness (OI) has been measured and identify the important factors affecting organisational innovativeness of public agencies. | <ul style="list-style-type: none"> ▪ Types of public sector innovation and OI were reviewed and compared. ▪ Public sector innovation has been measured but mostly in the developed economies. ▪ Latest research focus is on innovativeness rather than innovation. ▪ OI refers to the tendency and capability to innovate. ▪ Factors affecting OI are F1: Culture, F2: Leadership, F3: Strategy, F4: Workforce, F5: Resources, F6: Management, F7: Performance, and F8: Networks & External Contexts. |
| 2) To develop and validate a suitable measurement framework model and | <ul style="list-style-type: none"> ▪ Item indicators and constructs were developed from literature reviews, |

| Objectives | Results & Outputs |
|---|--|
| <p>indicators for measuring organisational innovativeness of public agencies.</p> | <p>IOC survey (n=12) and qualitative in-depth interviews (n=23).</p> <ul style="list-style-type: none"> ▪ POINT measurement model was developed and verified via EFA and CFA from quantitative online survey (n=290). ▪ POINT structural model was developed based on IPO system concept and the Contingency Effectiveness approach. ▪ Both models were found to be valid and were used to measure and compare POINT Scores in ASEAN. |
| <p>3) To create an online web-based application (POINTinno.com) to adequately measure organisational innovativeness of public agencies.</p> | <ul style="list-style-type: none"> ▪ POINTinno.com application was created at www.pointinno.com. Potential users need to get permission to use by the administrator. New users can register and use POINTinno.com to measure the POINT Index Score of their organisation. |
| <p>4) To test how POINTinno.com is perceived by the potential users and assess its commercialisation potential.</p> | <ul style="list-style-type: none"> ▪ TAM user acceptance survey (n=25) showed high acceptance score of 4.12 (SD. 0.77). ▪ Plan to register and set up a company limited to commercialise POINTinno.com via non-exclusive license. ▪ NPV = 1.60 million Baht, IRR=170%, payback period 12 months. |

8.1 Conclusions and discussions

8.1.1 Factors affecting organisational innovativeness of public agencies

Diverse literature and research studies on how innovation and organisational innovativeness of public agencies have been measured were reviewed and the POINT (Public Organisational Innovativeness Tool) factors were proposed to consist of 8 factors and 20 sub-factors as summarised in Table 8.2.

Table 8.2: POINT 8 factors and 20 sub-factors

| POINT factors | Sub-factors |
|---|---|
| F1: Culture innovativeness | IN01: Creativity IN02: Openness IN03: Risk taking and failure tolerance IN04: New public management (NPM) |
| F2: Leadership innovativeness | IN05: Transformation leadership IN06: Leadership commitment to innovation |
| F3: Strategy innovativeness | IN07: Strategic initiations towards innovation IN08: Strategic follow-through to mitigate changes, increase resilience, and performance |
| F4: Workforce innovativeness | IN09: Motivated workforce IN10: Capable workforce |
| F5: Resources innovativeness | IN11: Budget and fund for innovation IN12: R&D IN13: ICT and e-government |
| F6: Management innovativeness | IN14: Management practice IN15: Management capability |
| F7: Performance innovativeness | IN16: Innovative results, outputs, and outcomes IN17: New methods or processes that improve productivity and performance IN18: Effective evaluation mechanism and performance reward system |
| F8: Networks and external contexts innovativeness | IN19: Collaborative networks IN20: Favorable external contexts for innovation |

The measurement framework model of POINT was proposed along with the corresponding 59 items (or indicators) as shown in Figure 8.1 after the IOC content validation (n=12) with the experts from ASEAN member countries.

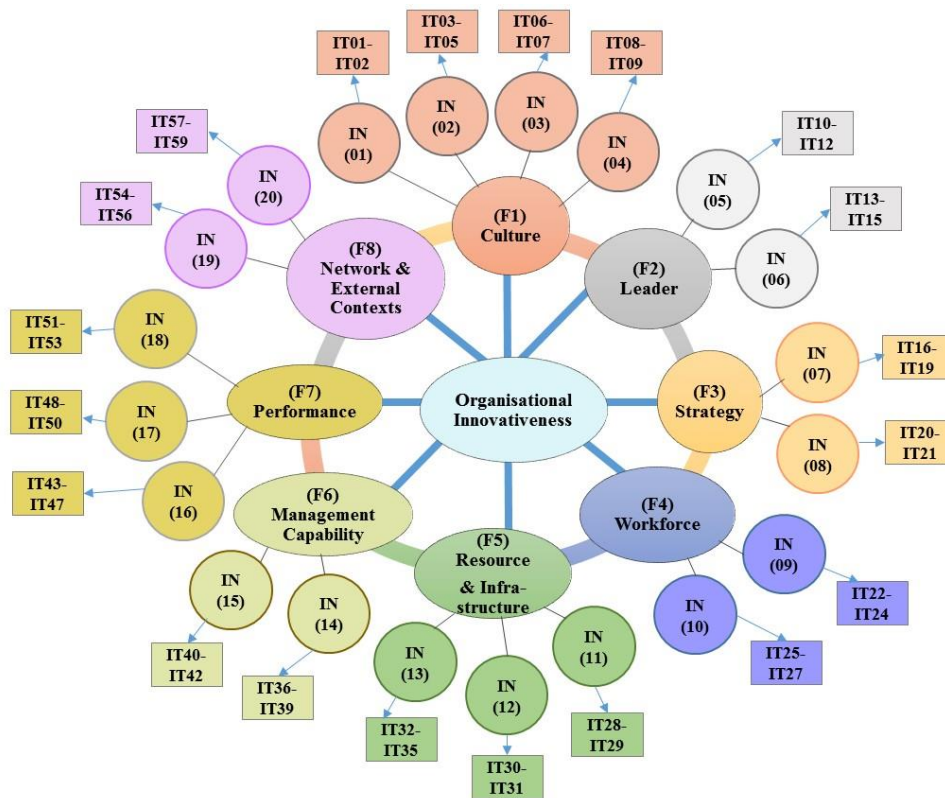


Figure 8.1: The POINT measurement model showing the 8 factors, 20 sub-factors, and 59 items

that were used to measure organisational innovativeness

The POINT measurement model assumes that the multivariate distribution is normally distributed and it can be used to describe the relationship between the observed variables and the constructs of the 8 variables that are hypothesized to measure the overall organisational innovativeness (POINT score). The second order CFA was used to verify this hypothesis and the results of the goodness of fit indices indicated that the proposed model fitted with the empirical results. Therefore, the

assumption that POINT score comprises of these 8 factors and 20 sub-indicators was proven valid.

The item statements or indicators for measuring public organisational innovativeness were proposed based on the literature reviews of existing scales for measuring innovation and innovativeness as well as the results of the in-depth interviews with 23 top executive, middle management, and senior employees of 16 public organisations in the ten ASEAN member countries. The qualitative analysis revealed that all the proposed eight factors of POINT were present in the participated ASEAN public organisations. Furthermore, the interviewees agreed that the proposed POINT factors could affect their organisational innovativeness and that it would be useful to have a tool that could adequately measure and compare organisational innovativeness at a national and regional levels.

Among all the eight POINT factors, most interviewees believed that F2: Leadership innovativeness was one of the most important factors because top leaders can directly decide to introduce and implement new initiatives that will likely to pervade the entire organisation. The same belief was also supported and observed from the quantitative online survey (n=290) of the respondents' important rating of the eight factors of POINT (see Table 6.1), in which F2: Leadership factor received the highest mean score of 4.73 and contributed to the highest weighted sum percentage of 13.28% in POINTinno.com program measurement equation.

Furthermore, the recent events in Myanmar, Indonesia, and Thailand reaffirmed the impacts of top political appointed ministers on how the policies and strategic goals were planned, carried out, and followed-through at organisation level. Leadership and strategy innovativeness factors were found to be closely linked to each other and this qualitative finding was also observed

The first example of leadership innovativeness impacts on the restructuring of government agencies was the decision of Myanmar government after the general election in 2016 to demolish and merge the previous divisions and functions of the Ministry of Science and Technology (MOST) into the Ministry of Education (MOE) to

streamline the budgets and address the issues of low STI research and innovative outputs in Myanmar education systems.

The second example was the establishment of the new Indonesia Ministry of Research, Technology and Higher Education (RISTEK-DIKTI) in 2015 by merging the former ministry (Ministry of Research and Technology) and sub-ministry organisation (Directorate General of Higher Education, under the Ministry of Education and Culture) with the aim to improve university R&D in STI areas.

The third example was Thailand 4.0 government initiative that resulted in cross-ministerial coordination and the reform of national R&D system by merging the relevant agencies into the new National Research and Innovation Policy Council in 2016 and both secretary generals of National Research Council of Thailand (NRCT) and National Science Technology and Innovation Policy Office (STI Office) jointly chair the secretariat role of the Council.

When comparing the types of public agencies under the ministerial level, it can be concluded that democratic-government based countries including Singapore, Malaysia, Thailand, Philippines, and Indonesia were found to support government-linked agencies, state enterprises, public-private cooperation, and new public management practices to be more business-like by increasing the autonomy of associated agencies under the govern ministries. On the other hand, communist-based party, military ruling, or dictatorship countries including Lao PDR, Cambodia, Myanmar, and Vietnam were found to prefer civil servant government style of associated agencies under the govern ministries with higher control from the central governments. Brunei Darussalam with absolute monarchy in which the sultan is the head of state and head of government exercises full executive authority by appointing ministers and top leaders to manage the ministries and associated government agencies.

Culture innovativeness factor or the climates and norms that encourage innovation namely creativity, openness, risk taking, and NPM were found to have strong effect on management practices (i.e. how things are done) and performance innovativeness of public organisations. Singapore had the highest culture factor score

in the initial ratings of the sub-factors of POINT and the quantitative results of Singapore's highest POINT Index Score on culture innovativeness also reaffirmed this verdict. Singapore public agencies in this study were more flexible with their approaches in dealing with problems and encouraged their staff to communicate and discuss new ways to improve existing operations.

Workforce motivation and capability were found to be crucial since the qualitative results suggested that talented workforce implied better performed and more competitive organisation. Quantitative results of second order CFA also indicated that the overall organisational innovativeness or POINT score could be explained by workforce innovativeness factor by 85.6%. SEM analysis revealed that workforce innovativeness factor had the second strongest direct effect to management innovativeness.

Resources innovativeness referred to the ability of an organisation to allocate, leverage, and maximize its budgets, R&D investment, and ICT and e-Government to foster innovation. High income Singapore and upper middle income countries including Malaysia and Thailand usually had sufficient resources for innovation purposes, whereas lower income countries (CLMV) faced with challenges to find sufficient funding to improve their organisational innovativeness. Another interesting finding was that Philippines with high scores of ICT and e-government sub-factor of POINT Index as observed from both qualitative and quantitative results was also ranked top among the ASEAN country by the Global Innovative Index (GII) under the ICT service exports indicator. Hence, in this case, POINT Index supported the measurement and rank results by GII.

Management practices and capability innovativeness factor was the mediator from the input factors (Culture, Leadership, Strategy, and Workforce innovativeness) to performance innovativeness factor in the POINT structural relationship model because qualitative results indicated management units were seen as the central coordination for internal administration and work processes. Management practices in ASEAN COST were focused on formal reporting along the chain of command that mainly promotes efficiency at best. As a result, not much improvement or innovativeness was observed.

Performance innovativeness can be measured based on the innovative results and outputs including new internal processes and effective evaluation system to improve organisational performance. Innovative organisations were expected to be better performed compared to other peer organisations. In this study, public agencies from Singapore, Malaysia, and Thailand were found to have higher Performance factor POINT Index Scores than other AMS.

Networks & external contexts innovativeness referred to the effective utilisation of collaborative network and alliances and favourable policy and legislative conditions for innovation. Both qualitative and quantitative results revealed that most of the participated public organisations had similar POINT Index Scores under Networks factor. Consequently, Networks & external contexts innovativeness factor was found to have the least factor loading among all the eight POINT factors and had relatively weak total direct and indirect effects to Management and Performance factors.

8.1.2 Verifications of POINT measurement and structural models

The proposed constructs of the POINT measurement model were validated via quantitative survey (n=290) with the respondents from public organisations in the ten ASEAN member countries and factor analysis to verify the measurement model. The internal consistency reliability test of the POINT measurement construct resulted in excellent range of Cronbach's Alpha coefficient values from 0.896 in F3: Strategy factor to 0.937 in F8: Networks factor.

Most of the survey respondents were female (61.7%), from Thailand (66.2%), working in an agency under a ministerial level (63.4%), age 36-45 years old (39.3%), had Master's degrees (57.2%), with qualification in STEM (64.5%), and had been with their organisations for 11-20 years (30.2%), and their motivation for working in public organisations were mainly for job security (76.6%).

The average mean POINT scores of all the participated public organisations in ASEAN were calculated and the overall average mean score was 3.12 (SD. 0.786) or average normalized weight adjusted POINT Index Score 60.31. The results of the POINT scores were standardized and used to develop POINTinno.com online web-based application to measure and compare OI at different levels of organisational, national, and ASEAN.

The rankings of POINT Scores in ASEAN were as follows:

| Rank | POINT Score | POINT Index Score |
|--|-------------|-------------------|
| 1 st rank Singapore | score 4.08 | 77.98 |
| 2 nd rank Malaysia | score 3.61 | 69.00 |
| 3 rd rank Thailand | score 3.31 | 63.74 |
| 4 th rank Indonesia | score 3.10 | 60.20 |
| 5 th rank Philippines | score 3.09 | 59.31 |
| 6 th rank Vietnam | score 3.03 | 58.52 |
| 7 th rank Brunei Darussalam | score 2.95 | 57.29 |
| 8 th ranks Lao PDR | score 2.83 | 55.82 |
| 9 th rank Cambodia | score 2.63 | 51.30 |
| 10 th rank Myanmar | score 2.52 | 49.94 |

The proposed POINT measurement model as well as the structural relationship model were verified by the EFA, CFA, and SEM.

Exploratory Factor Analysis (EFA) analysed unrestricted model where all the indicators were not fixed to any specific parent factors. The EFA results indicated that the items in each POINT factor can be grouped to match the original proposed parent factor except for F2: Leadership and F3: Strategy factors that were found to have high cross-loadings. The strong linkages and high correlations between leadership and strategy innovativeness factors could be explained by the fact that leaders normally initiate and push forward the strategic plans and agendas to other organisational units to implement. In fact, for innovative organisation, top executives should develop clear

views and final long-term aims than less significant short term objectives (Aragon-Correa et al, 2007).

First order CFA results to verify the proposed POINT measurement constructs to the empirical data revealed that all the proposed items in each POINT factor had high internal factor loadings at the significant level of $p < .01$. High correlations of the indicators mean that the proposed items can be used to represent and adequately measure each POINT factor.

Model fit and assessment of goodness of fit indices in second order CFA showed that the proposed POINT measurement construct was in good fit with the empirical data. Hence, the assumption that the overall POINT factor can be represented by the proposed eight factor constructs is valid.

Table 8.3: First and second order CFA results of factor loadings and explained variance

| Indicators | 1 st Order factor loading | 1 st Order R^2 | 2 nd Order factor loading | 2 nd Order R^2 |
|-----------------|--------------------------------------|-----------------------------|--------------------------------------|-----------------------------|
| F1: Culture | .894 | .800 | .927 | .869 |
| F2: Leadership | .845 | .715 | .906 | .821 |
| F3: Strategy | .874 | .764 | .925 | .865 |
| F4: Workforce | .874 | .765 | .899 | .856 |
| F5: Resources | .798 | .649 | .804 | .729 |
| F6: Management | .902 | .813 | .933 | .883 |
| F7: Performance | .871 | .759 | .890 | .809 |
| F8: Networks | .662 | .439 | .738 | .636 |

The first and second order factor loadings and percentages of variance are summarised in Table 8.3. All of the second factor loadings were greater than 0.7 indicating that there were high correlations between the proposed POINT factors and the indicators measuring OI. The R^2 values represent the percentage of variance of the dependent variable POINT score that are accounted for by the independent variables F1-F8. High values of factor loadings and R^2 were observed in all the eight POINT

factors except in F8: Networks in which first order factor loading of 0.662 and R^2 value of 0.439% were much lower than other POINT factors.

Relatively weaker correlation of F8: Networks factor was also observed in the SEM results. This finding revealed that among all the proposed eight factors of POINT, F8: Networks and external contexts innovativeness had the least effect and contribution to POINT score.

Weak contribution to POINT of networks and external contexts factor could be because most of the survey respondents were from public organisations that has been associated with the ASEAN COST network. Most of the organisations already made full use of the existing collaborative networks in COST and therefore, this factor may not result in much improvement to the organisation OI as previously assumed.

The strongest contribution to the POINT score comes from F6: Management innovativeness factor in the CFA results with the strongest correlation factor loading 0.933 and percentage of variance explained 88.3%. The CFA results also confirm in good agreement with the SEM results of the POINT structural model in which Management factor had the strongest direct effect as the main mediator connecting the input-side variables namely F1: Culture, F2, Leadership, F3: Strategy, and F4: Workforce to the dependent variable F7: Performance innovativeness.

This result empirically indicates that management practices and capability can strongly influence organisational performance. Therefore, innovative and highly performed organisation requires capable management division that can effectively manage and convert input factors such as organisational objectives and workforce to meaningful results and outputs.

Apart from the strong direct effect from management to performance factor, there was also a strong statistically significant two-way negative effect observed between these two factors. The negative effect of the management factor on the organisational performance means that the level of organisational performance is reciprocally reduced as the results of poor management practices and capability.

This observed two-way negative effect is indeed underlines the concept of the Organisational Ambidexterity (Duncan, 1976). As more public organisation employees would like to see performance improvement and contribute to more innovative outputs and outcomes, they feel that existing bureaucratic management style may result in ineffective internal processes and procedures that prevent them from being more effective and innovative. In order to implement critical management practices, top leaders and senior managers must change their attitude towards innovation for the changes to pervade and sustain.

This finding is in agreement with the previous studies by Bason, 2010; Boukamel & Emery, 2017; and March, 1991 that the disruptive nature of innovation involving new changes are in contrast with the tendency of public agencies to adhere to stable work routines. This is one of the struggles many of the public organisations in ASEAN are currently facing and must overcome in order to be more competitive.

The composite weighted POINT Index in POINTinno.com online application was developed from the factor loadings and factor scores obtained from the CFA results.

The analysis of the construct reliability (CR), convergent validity from the Average Variance Extracted (AVE), and discriminant validity by comparing whether AVE is greater than maximum shared squared variance (MSV) was conducted in the revised POINT structural relationship model.

For the eight POINT factors, the CR values were all higher than 0.7 and hence, suggest good reliability of the construct.

The resulted AVE values were all greater than .50 and lower than CR indicating that the variance explained by the construct was greater than measurement error and greater than the cross-loadings. Hence, the POINT construct had convergent validity.

The test of discriminant validity showed that most of the POINT factors had discriminant validity except for the case of F1: Culture and F2: Leadership innovativeness factors in which the values of AVE were greater than the corresponding

MSV values. This could be because the items designed for measuring F1: Culture and F2: Leadership innovativeness factors were cross-loadings onto the other factors in the model or their construct might be better explained via formative measurement model than reflective measurement model.

In conclusion, the verifications of the proposed POINT measurement and structural relationship models provide supporting empirical evidence on the effects of the eight POINT determinant factors that can be used to measure organisational innovativeness. The results of SEM provide added benefit that the correlations among the measured variables are an indication of their reliability.

8.1.3 POINTinno.com online application development

POINTinno.com was developed as an online web-based application to measure organisational innovativeness of public agencies. The website to access POINTinno.com is at www.pointinno.com. The application is intended to be used as a decision support system for users to determine their organisational innovativeness and identify the areas that they should improve in order to be more innovative. The factor weighting was derived from user opinion rating of factor importance and factor analysis derived weights for item indicators.

The similarity in predicting the rankings of organisational innovativeness by POINT Index of public organisations in ASEAN was compared with other well-known indices for instance the WEF overall GCI, GCI sub-index Innovation Indicator, GII overall ranking, and GII sub-index Government Effectiveness Indicator. The similarity comparison showed that POINT Index had 60% ranking similarity to the WEF overall GCI, 80% to the GCI sub-index Innovation Indicator, 40% to the GII overall ranking, and 40% to the GII sub-index Government Effectiveness Indicator. Thus, it can be concluded that POINT Index rankings were in good agreement with other indices despite the fact that POINTinno.com indicators consist of all subjective rating by users.

For more accurate results, at least 3 users from different positions and departments in an organisation are required to use the application in order to determine the average organisational POINT Index Scores and allow the comparison of the organisational level of innovativeness to the national and ASEAN average POINT Index Scores. Indeed, more users will result in more accurate measurement results since the application is based on subjective user opinion ratings. POINTinno.com was developed with internal database to keep records of the POINT Index Scores of the previously registered users and is able to show and compare the results in a graphical displays up to 3 years back from the latest date of use of all the users from that particular organisation.

It is recommended that POINTinno.com should be used as part of organisation strategic plan to measure organisational innovativeness once every six months or once a year by all employees of the organisation in order to compare the level of innovativeness with other peer organisations at the national and ASEAN regional levels. POINTinno.com is able to identify the areas of organisational innovativeness factors with low POINT Index Scores and automatically gives suggestions and recommendations to users accordingly on how and what activities to pursue in order to improve their organisational innovativeness. Organisations with low levels of innovativeness or innovation capability may require additional assistance from external experts and consultants in order to improve internal operations and develop non-technological or administration innovation.

8.1.4 Commercialisation assessment

The user acceptance survey questionnaire was developed with the items to measure the perceived usefulness, perceived ease of use, and behavioural intention to use the new technological product based on the TAM concept. The potential users (n=25) from Thailand, Malaysia, and Philippines were asked to complete the online survey after they had used POINTinno.com.

The overall score of the average user acceptance of POINTinno.com was 4.12 (SD 0.771) which is in the high level, suggesting that the potential users believed that the application would be useful, easy to use, and intend to use in their organisation.

The results showed that the Mode average price of per access determined by the users was 5,000 Baht and the Mode average price one-year membership fee with consultation was 20,000 Baht. These results were then used in the estimations of the financial feasibility of POINTinno.com Mode averages were used instead of Mean average values because the results were skewed and the lower price of the application should entice more users to want to use it.

The commercialisation potential analysis was based on the concept of project feasibility. A company limited will be set up in Thailand to commercialise POINTinno.com based on non-exclusive licensing to potential public organisations in Thailand and in ASEAN member countries. The financial analysis revealed that POINTinno.com is quite attractive for investors with the estimated the Net Present Value (NPV) at 1.60 million Baht, Internal Rate of Return (IRR) at 170%, and payback period at 12 months.

8.2 Limitations of the research

Sampling limitation of this research arose because the participations to the quantitative survey were on voluntary basis. Even though all the ten ASEAN member countries participated in the survey, nearly two third of the survey respondents were from Thailand since this is where the researcher has the most direct contacts to the target public organisations. More participations from other public organisations in ASEAN can help improve the results of the POINT Index Scores and for the data to be more equally distributed among all the ten ASEAN member countries. This is to ensure higher accuracy of the average POINT scores. This limitation can be overcome with longer period of survey collection and compulsory participations of the target public organisations.

Sampling limitation on the user acceptance test of POINTinno.com application that was conducted only with a small selected groups of target users in Thailand, Malaysia, and Philippines. Wider range and higher number of participations can help promote the use of POINTinno.com in more target public organisations as well as increase the inputs and comments to further improve the features of the application as recommended by the potential users.

Case specific limitation arose due to purposive sampling and the fact the main group of the qualitative interviews and the quantitative survey were conducted only with the employees of public agencies that had the main functions to promote science, technology, and innovation. Hence, the inputs and results that were used to develop the items in the constructs may be case specific to a certain degree to these groups of users.

8.3 Recommendations

8.3.1 Recommendations for implementation

The twenty sub-factors proposed in the theoretical POINT measurement model as well as the eight main factors of 1) culture, 2) leadership, 3) strategy, 4) workforce, 5) resources, 6) management, 7) performance, and 8) networks and external contexts can be further explored and developed into a more accurate composite index to measure public sector organisational innovativeness. The indicators can be expanded to include more objective measurements that are available and possible to be collected for comparison across target users in different countries.

The revised POINT structural model should be further analysed since the findings support strong relationships of F6: Management factor as the main mediator that can indirectly influence other factors in the organisational innovativeness constructs. Further explorations of the factors affecting the structural model should provide more insights of the relationships among the proposed factors and sub-factors that can be utilised to develop more specific and more detailed user recommendations to improve the organisational innovativeness and competitiveness.

At organisational level, assessments from POINTinno.com application require strong commitments from top organisation leaders and management to follow up with the program recommendations in order to implement new changes and revoke status quo of how things are done. After all, innovation should be managed with a long term perspective by dividing the goals into separate implementation stages of short term deliverables and medium-long term achievements.

At ASEAN regional level, POINT Index could be utilised and further developed to be one of ASEAN region-wide composite index benchmarks and rankings of public agencies in central or local governments as well as public universities with R&D and innovation outputs. Since POINTinno.com was developed with the capacity to include additional indicators or factors that can be tailor-made to be suitable for measuring organisational innovativeness, further adjustments can be made to improve the indicators, measurement accuracy, predictions, and user recommendations. Policy recommendations can be made for national governments to raise their public sector organisational innovativeness across various ministries and government bodies. Top innovative countries namely Singapore and Malaysia can use the results of POINT Index to strategically engage with “ASEAN help ASEAN” community integration scheme, in which more economically advanced and more innovative ASEAN member states voluntarily assist others with less technological capability and knowhow.

8.3.2 Recommendations for future research

Future research should include cross sectoral studies of POINT measurement framework model with other public organisations in other networks that do not have their main mandates and functions involving the development and promotions of STI.

Other underlying latent variables in the structural relationship model could be further explored in order to access whether certain indicators can be statistically grouped under different dimensions than previously conceptualised and whether certain dimensions should be merged or split to adequately measure organisational innovativeness.

Longitudinal studies of the organisations that use POINTinno.com application should be conducted in future research in order to gain more insights and understanding on how the application can be utilised as a strategic decision supporting tool to improve public sector organisational innovativeness. The results gained from such research can also be used to enhance the accuracy of the application to pinpoint specific organisational innovativeness areas and recommend the required strategy and activities accordingly to the participated organisations.



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APPENDIX 1

Interview appointments with the public organisations in ASEAN

| Country | Organisation | Name and position | Interview date |
|-------------------|--|--|---|
| Brunei Darussalam | Ministry of Development (MOD) | Mr. Bob Raini Rambli Senior officer Policy coordination and strategic planning, MOD | 28 May 2015 COST-69 Phuket, Thailand |
| Cambodia | Ministry of Industry and Handicraft (MIH) | Mr. Sok Chea Deputy director Department of Science and Technology, MIH BAC Representative | 22 September 2016 ASEAN STI Forum Bangkok, Thailand |
| Indonesia | Ministry of Research, Technology and Higher Education (RISTEK- DIKTI) The ASEAN Secretariat (ASEC) and the ASEAN COST | Ms. Trina Fizzanty, Ph.D. Director Research Center for the Development of Science and Technology (PAPPIPTEK-LIPI), RISTEK-DIKTI Mr. Alexander A. Lim, Ph.D. Previous Head of Science and Technology Cooperation, ASEC Ms. Alice Lee Sing Cheong Head of Science and Technology Cooperation, ASEC | 22 May 2015 The 3 rd ASEAN Talent Mobility Workshop Phuket, Thailand 22 September 2016 ASEAN STI Forum Bangkok, Thailand 17 December 2017 Pre ASEAN Next Discussion workshop, MOST Patumwan Princess Hotel, Bangkok, Thailand 28 October 2016 COST-71, Siem Reap, Cambodia |

| Country | Organisation | Name and position | Interview date |
|----------|---|---|---|
| | | Mr. Dimas Adekhrisna Senior Officer, ASEC | |
| Lao PDR | Ministry of Science and Technology (MOST) | Mr. Kongsaysy Phommaxay Director Science Division, MOST National Representative of SCIRD | 24 October 2016 COST-71, Siem Reap, Cambodia |
| | | Mr. Sombounmy Phomtavong, Ph.D. Director International Cooperation Division Department of Planning and Cooperation, MOST | 25 October 2016 COST-71, Siem Reap, Cambodia |
| Malaysia | Ministry of Science, Technology and Innovation (MOSTI) Sarawak Biodiversity Centre (SBC) | Mr. Mokhtar Tahar, Ph.D. Senior Undersecretary, MOSTI BAC Representative | 25 May 2016 The 1st Meeting of Board of Advisers to COST (BAC) Brainstorming Session on APASTI Implementation Plan Bangkok, Thailand |
| | | Mr. Charlie Yeo Tiong Chia, Ph.D. Chief Executive Officer, SBC | 20 November 2017 SBC, Sarawak, Malaysia |
| Myanmar | Ministry of Education (MOE) | Prof. Mi Sandar Mon, Ph.D. Director Department of Higher Education, MOE | 2 March 2017 Phone Interview and Email Correspondence |

| Country | Organisation | Name and position | Interview date |
|-------------|--|---|--|
| | | BAC Representative | |
| Philippines | Department of Science and Technology (DOST) | Ms. Amelia P. Guevara, Ph.D. Undersecretary for Research and Development, DOST BAC Representative | 25 May 2016 The 1st Meeting of Board of Advisers to COST (BAC) Brainstorming Session on APASTI Implementation Plan Bangkok, Thailand |
| Singapore | Agency for Science, Technology and Research (A*STAR) | Ms. Sarah Chang Kai Chen, Ph.D. Director International Relations and Partnerships Division, A*STAR National COST Focal Point Ms. Melissa Leong Assistant to the Director International Relations and Partnerships Division, A*STAR | 26 October 2016 COST-71, Siem Reap, Cambodia 26 October 2016 COST-71, Siem Reap, Cambodia |
| Thailand | Ministry of Science and Technology (MOST) National Electronics and Computer Technology Center (NECTEC), National Science and Technology Development Agency (NSTDA) | Ms. Thamaporn Apison Director International Cooperation Division, MOST National COST Focal Point Ms. Sawamitree Promyos Senior foreign relation officer | 25 May 2016 The 1st Meeting of Board of Advisers to COST (BAC) Brainstorming Session on APASTI Implementation Plan Bangkok, Thailand 24 October 2016 COST-71, Siem Reap, Cambodia |

| Country | Organisation | Name and position | Interview date |
|---------|---|---|--|
| | National Science Technology and Innovation Policy Office (STI Office) | <p>International Cooperation Division, MOST</p> <p>Ms. Duangrat Gansawat, Ph.D.</p> <p>Senior Researcher</p> <p>Image Technology Lab</p> <p>NECTEC, NSTDA</p> <p>Mr. Kitipong Promwong, Ph.D.</p> <p>Secretary General, STI Office</p> <p>Ms. Rungnapa Tongpool, Ph.D.</p> <p>Director</p> <p>Organisation and System Development Division, STI Office</p> <p>Mr. Asira Chirawithayaboon</p> <p>Director</p> <p>Organisation Management Division, STI Office</p> <p>Mr. Parinand Varnasavang</p> <p>Policy Specialist</p> <p>International Cooperation Division, STI Office</p> | <p>19 December 2017</p> <p>Bangkok, Thailand</p> <p>26 January 2018</p> <p>Bangkok, Thailand</p> <p>26 January 2018</p> <p>Bangkok, Thailand</p> <p>26 January 2018</p> <p>Bangkok, Thailand</p> <p>26 January 2018</p> <p>Bangkok, Thailand</p> |
| Vietnam | Ministry of Science and Technology (MOST) | <p>Ms. Bui Thi Thu Lan</p> <p>Head of Division</p> | <p>27 October 2016</p> <p>COST-71, Siem Reap, Cambodia</p> |

| Country | Organisation | Name and position | Interview date |
|---------|--|---|--|
| | National Institute for Science and Technology Policy and Strategy Studies (NISTPASS) | General Affairs and Multilateral Cooperation Division Department of International Cooperation, MOST Mr. Bach Tan Sinh, Ph.D. Deputy Director NISTPASS | 3 April 2015 ASEAN Talent Mobility Research Project Visit, MOST, Hanoi, Vietnam |
| Total | | | 23 Interviewees |



APPENDIX 2

INTERVIEW GUIDELINE

Organisational Innovativeness of Public Agencies in ASEAN

1. Introduction

The study “Organisational Innovativeness of Public Agencies in ASEAN” is part of Ph.D research conducted by Ms. Salinthip Thipayang under the Technopreneurship and Innovation Management Programme of Chulalongkorn University in Bangkok, Thailand. The objective of this interview is to identify factors and conditions that top executives and managers of public/government organisations in ASEAN believe are crucial in fostering innovation activities and making their organisations more innovative and successful. The identified factors will then be used to develop Public Organisation Innovativeness Tool (POINT) that can help leaders and managers make better informed decisions and improve their organisation in the identified areas to become more innovative and competitive in the current era of global knowledge-based economy.

2. Background information and definitions of important terms

Innovation in public organisation is “the introduction, adoption, and implementation of a new idea, strategy, management practice, communication process, or operational method, which result in a new development, improved outputs, outcome, and performance of the organisation. The impact of the innovation can result in better service quality delivery or increase efficiency, policy effectiveness, and values to the society”.

Organisational Innovativeness is “the overall tendency and capability of the organisation to introduce and support innovative activities, processes, practices, and cultures that improve its operation, performance, efficiency and competitiveness”.

The organisational activities, processes, practices, and cultures that are known to affect organisational innovativeness are listed in the following examples:

- Organisational culture, norm and climate that encourage innovation such as creativity, openness, risk taking, failure tolerance, willingness and adaptability to change and challenges, organisational learning, and knowledge sharing.
- New public management practice and governance.
- Leader and management practices and commitment towards innovation.
- Clearly identified and articulated organisational values, visions, missions, mandates, goals, and targets.
- Employees share the same visions of the organisation future and targets.
- Open and effective communication among all departments.
- Explicit strategy initiation and follow-through mechanism to mitigate changes and increase resilience.
- Talented, capable, and motivated workforce.
- Sufficient resources and supportive infrastructure e.g. budgets, R&D, ICT.
- Utilisation of national and international collaborative networks and linkages.
- Cross-sectoral collaborations of public-private-academic partnerships.
- Performance evaluation system and management that is effective and easy for progress monitor.
- Performance comparison with other peer organisations with similar missions.
- Favourable external conditions e.g. government policies and mandates, political initiatives, laws, and legislations.

- Other organisational functions and projects that may lead to new developments, better service delivery or outcome that increase efficiency, policy effectiveness, and values to the society.

3. Disclaimers

There is no direct benefit of the researcher in this interview other than for academic research purposes. Interview participation is voluntary and there is no direct benefit provided for the participants of this interview. However, it is hoped that through your participation, the results of the interview will provide valuable insights and contributions towards improving organisational innovativeness of public agencies in ASEAN. Innovative public organisations will be more efficient and better performed in providing improved quality services and programmes for the public and address the economical and societal challenges that are facing developing countries in ASEAN.

4. Confidentiality

All data and primary information obtained from the interviewee will be treated as strictly confidential. Your personal details and comments that you provide in this interview and questionnaire will not be disclosed to the public. The findings and results will be reported in aggregate manner or combined format that omit individual results and opinions.

5. Acknowledgements

The researcher wishes to thank the participants for the information and time provided in taking this interview and questionnaire. Your participation in this interview is very much appreciated. Thank you for your opinions and inputs.

6. Contact details

If you have questions regarding this research study, please contact the researcher Ms. Salinthip Thipayang at mobile number: +6685-314-8840 or email: salinthiphd@gmail.com.

APPENDIX 3

INTERVIEW QUESTIONS

Organisation: _____

Interviewee: _____

Date: _____

Part 1: Organisational structure, function and changes that impact the work processes and performance of the organisation

Q1. In your opinion, what are the characteristics of “innovative organisation”? Please describe innovative organisation with some keywords.

Q2. Please explain the management hierarchy and chain of decision and command in your organisation

Q3. Are there any areas in the organisational structure, hierarchy, manpower, HR management, resources and budgeting, KPI and performance audit, monitoring and evaluation processes and mechanism that you think can be changed to improve the efficiency and capability of your organisation? Please describe and give examples.

Part 2: Organisational Innovation and Innovativeness

Q4. Are there any major changes in your organisation in the following areas in the past 5 years? Please describe how these changes impact your organisation routines, work processes, and performance.

Table 1: Major changes that affect your organisation in the past 5 years

| Category | Sub-Category | Yes | No | Description of impact of changes in the past 5 years |
|---------------------------|---|-----|----|--|
| Leadership | Change of board of executive/director committees | | | |
| | Change of top management teams or departments | | | |
| Strategy | New organisational mandates, strategic goals, outputs, or targets towards innovation | | | |
| Organisational structure | Change in organisational structure and internal departments (e.g. collapse, expand, decentralization) | | | |
| | Spin-off or spin-out of new organisations or units | | | |
| Administrative management | New project progress monitoring platform/system | | | |
| | New performance monitoring and evaluation system e.g. new organisational KPI | | | |
| | New knowledge sharing platform e.g. new intranet among employees | | | |
| | New internal audit processes | | | |
| | New risk management system or processes | | | |
| | New purchasing and procurement activities | | | |
| | Other (Please specify) | | | |
| Workforce and HR | Change in HR recruitment method and practice | | | |
| | New career development and progress opportunities for employees | | | |
| | New training systems, workshop, and further education opportunities for employees | | | |

| Category | Sub-Category | Yes | No | Description of impact of changes in the past 5 years |
|---|---|-----|----|--|
| | New incentives and reward for talented or high performing employees | | | |
| | Hiring external experts on contract basis | | | |
| | Other HR related activities (please specify) | | | |
| Resources and infrastructure | New sources of budget/fund for innovation e.g. from central government, local government, private business enterprises etc. | | | |
| | New R&D units/teams | | | |
| | New ICT investment e.g. providing employees with personal computers, upgrade to faster broadband internet and Wi-Fi | | | |
| | New acquisitions of external knowhow e.g. patents, licenses, technologies | | | |
| | Other activities (please specify) | | | |
| | | | | |
| Performance, innovation outputs, and evaluation | New innovation products as a results of R&D | | | |
| | New innovation services | | | |
| | New methods of producing goods or services e.g. techniques, equipment, software | | | |
| | New patents or patent applications | | | |
| | New research publications and articles | | | |
| | Other innovation outputs (please specify) | | | |
| Collaborative networks | New <i>national</i> collaborative networks and partnerships with other public/government agencies, | | | |

| Category | Sub-Category | Yes | No | Description of impact of changes in the past 5 years |
|-------------------|--|-----|----|--|
| | private business enterprises, research universities, citizens, and local communities | | | |
| | New <i>international</i> collaborative networks and partnerships with other public/government agencies, private business enterprises, research universities, citizens, and local communities | | | |
| | Other form of collaborations and partnerships (please specify) | | | |
| External contexts | Change of central/national government policies and regulations | | | |
| | Change of local/state government policies and regulations | | | |
| | New R&D guidelines and conducts | | | |
| | New political initiatives and innovation related activity support | | | |
| | Other external conditions (please specify) | | | |

Q5. Please tick ✓ only 1 score per factor based on how important you think the following factors can affect your organisation innovation capability and performance.

- 1 = Not at all important
 2 = Not important
 3 = Indifferent or Neutral
 4 = Important
 5 = Very important

Table 2: Factors affecting organisation innovation capability and performance

| Factors affecting organisation innovation capability and performance | Score of Importance | | | | |
|---|---------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1. Creativity or the organisation cultural aspect that values and constantly initiates and seeks new ideas, new knowledge, new concepts, and new methods to improve existing practices and operational processes, or solve problems | | | | | |
| 2. Openness to new ways of doing things and responsive to changes and challenges. Open communication channels are readily available among top executives and employees across different divisions within the organisation. | | | | | |
| 3. Risk taking and failure tolerance that encourage testing of new concepts and methods even knowing that they might fail in order to improve the organisation outputs, efficiency, and performance and learn from trials and mistakes. | | | | | |
| 4. New public management values and governance refer to the public organisational design, structure, and management practices that is more businesslike, less bureaucratic, and increase efficiency in serving the society. | | | | | |
| 5. Organisational leaders' practices and commitment towards innovation. Leaders act as catalysts of constructive changes, seek to remove barriers for the organisation to succeed, and are genuinely committed to operate the organisation with integrity to serve the public and create positive social impact. | | | | | |
| 6. Strategic initiations towards innovation and follow-through. Organisation values, visions, missions, mandates, and goals are clearly | | | | | |

| Factors affecting organisation innovation capability and performance | Score of Importance | | | | |
|---|---------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| identified and shared among all employees. Employee work goals are clearly defined against measurable criteria and are aligned to the organisation's objectives. There are strategic plans and mechanisms in place to mitigate negative changes and increase resilience. | | | | | |
| 7. Motivated and capable workforce. Employees take positive actions and are motivated to further the organisation's interests and achieve organisational objectives. Talented and high performing employees are rewarded and retained. Trainings and educations are provided to increase employees' skills and capabilities. | | | | | |
| 8. Resource and infrastructure refer to the ability of the organisation to allocate, leverage and maximize its resources (inputs to innovative processes) and intellectual capital including budgets and funds, ICT investments, R&D, and accumulated knowledge to create new knowledge, improve efficiencies, get better results and higher impact for the organisation. | | | | | |
| 9. Management practices and capabilities. This is the ability and capability of the organisation to manage new ideas, implement practices, and diffuse what works within the organisation. Management approaches can improve innovation processes, exploit human capital and resources, challenge existing structure and framework conditions within the organisations in order to be more productive and improve innovation outputs. | | | | | |
| 10. Performance, innovation outputs, and evaluation refer to innovative results, outputs, outcomes, new methods/processes that improve organisation's capability and performance. These also include efficient and effective evaluation mechanism to ensure that the organisation meets its targets and goals. Innovative organisation needs to compare its performance and productivity with peer | | | | | |

| Factors affecting organisation innovation capability and performance | Score of Importance | | | | |
|--|---------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| organisations with similar mandates, have reliable performance management system in place, seek to incorporate performance measurement effectively into its day-to-day operations, and refine existing performance measurement system when necessary to reflect changing government policies and agendas. | | | | | |
| 11. Collaborative networks and partnerships refer to utilisations of collaborative networks and alliances with other agencies from public, private and academic sectors nationally and internationally to increase capabilities, best practices, and knowhow. Collaborative network can enhance innovative capability and help shared resources to achieve the organisation targets. | | | | | |
| 12. External contexts and linkages for innovation can interfere with how the organisation manages its innovation processes and implementations and can be both drivers and barriers to organisational innovation processes depending on how the circumstances are managed. These external contexts include national and regional policies and regulations, country leader attitudes towards innovation, how the government agencies and ministries are monitored, regulated and aligned with other agencies to achieve target policies and results, linkages with private sector, academia and other public agencies both within the country and internationally. | | | | | |
| Other factors that are not mentioned (please specify) | | | | | |

Part 3: Potential utilisation of the public organisational innovativeness assessment tool

Q6. Do you use any strategy planning and performance management tool such as balanced scorecard to match your goals/objectives to quantitative target and KPI on an annual basis? How do you monitor your division work progress and performance?

If there is a reliable self-assessment web-based online tool that is easy to use and does not require detailed quantitative data inputs on your part that can adequately measure, compare, and assess the important factors affecting the organisational innovativeness of your organisation in comparison to other peer organisations nationally and internationally available to you to use:

Q7. Do you think this self-assessment web-based online tool will be useful in assisting you to make better informed decisions in managing your organisation?

Yes No Not sure

Q8. Would you consider using this tool to determine and identify areas within your organisation that can be strategically improved to make your organisation more innovative and competitive?

Yes No Not sure

Thank you for your comments and inputs. Your valuable contributions to this research study are highly appreciated.

APPENDIX 4

List of experts participated in the content validity test via IOC method

| Expert list No. | Name and organisation | Country | Rationale for participation request |
|-----------------|--|----------|--|
| 1 | Prof. Emeritus Dr. Achara Chandrachai Faculty of Commerce and Accountancy Chulalongkorn University | Thailand | Main advisor and expert in organisational innovation management |
| 2 | Assoc. Prof. Dr. Pasu Decharin Faculty of Commerce and Accountancy Chulalongkorn University | Thailand | Thesis examiner and expert in organisational innovation management |
| 3 | Asst. Prof. Dr. Sukree Sinthupinyo Department of Computer Engineering Faculty of Engineering Chulalongkorn University | Thailand | Supporting advisor and expert in online web-based application development |
| 4 | Asst. Prof. Dr. Paisarn Sonthikorn Electronic and Telecommunication Engineering Faculty of Engineering King Mongkut's University of Technology Thonburi | Thailand | Has experiences in organisational management research and used to work with the ASEAN COST networks and associated organisations |
| 5 | Dr. Janjiran Janchome Management director of S Channel ICC International Company | Thailand | Has experiences in Ph.D thesis on organisational innovation management research and online application for private enterprises in Thailand |
| 6 | Dr. Duangrat Gansawat Senior Researcher Image Technology Lab NECTEC, NSTDA | Thailand | One of potential users in a public organisation in Thailand |
| 7 | Dr. Rungnapa Tongpool Director Organisation and System Development Division | Thailand | One of potential users in a public organisation in Thailand |

| Expert list No. | Name and organisation | Country | Rationale for participation request |
|------------------------|---|------------------|---|
| | National Science Technology and Innovation Policy Office (STI Office) | | |
| 8 | Dr. Piengpen Wongnapapan Deputy Director Institute for Technology and Innovation Management Mahidol University | Thailand | Former Director at STI Office and one of potential users in a public organisation in Thailand |
| 9 | Assoc. Prof. Dr. Chris Wong Chow Jeng School of Physics University Sains Malaysia (USM) | Malaysia | Has previous experience in working with the ASEAN COST networks and associated organisations |
| 10 | Assoc. Prof. Dr. Irene S. C. Siaw Lee Shau Kee School of Business & Administration Open University of Hong Kong (OUHK) | Hong Kong, China | Has previous experiences in organisational management research |
| 11 | Dr. Sarah Chang Kai Chen Director International Relations and Partnerships Division Agency for Science, Technology and Research (A*STAR) | Singapore | One of potential users in a public organisation in Singapore and also holding the position of the ASEAN COST Focal Point of Singapore |
| 12 | Ms. Alice Lee Sing Cheong, M.Eng Head of Science and Technology Cooperation The ASEAN Secretariat (ASEC) | Indonesia | One of potential users in a public organisation in Indonesia and also holding the position of the main coordinator and administration in the ASEAN COST networks and associated organisations |

APPENDIX 5

IOC (Item-to-Objective Congruence) questionnaire to assess the content validity of the proposed item statement construct for measuring the organisational innovativeness of public agencies in asean

Please see the attached documents for detailed information regarding the definition of organisational innovativeness, the proposed factors and indicators to measure organisational innovativeness in public agencies, and the related references where the proposed item statements are taken or derived from.

Questionnaire instruction

Please mark “X” in the box to indicate your opinion on the validity or the suitability to include in the construct the proposed item statements for measuring organisational innovativeness of public agencies in developing countries in which:

- +1 = the item statement is valid or suitable to be included in the measurement construct
- 0 = not sure whether the item statement is valid or not
- 1 = the item statement is not valid or not suitable to be included.

Please also provide additional comments in the last column if you think that the proposed item statements can be further adjusted or changed to improve the content validity in the measurement construct.

Invited Experts who answer this questionnaire

Name: _____

Position/ Affiliation: _____

Organisation: _____

Date: _____

Thank you for your valuable opinions and useful inputs in assessing the content validity of the proposed item statements. Your participation in answering this questionnaire is very much appreciated.

Ms. Salinthip Thipayang
PhD Candidate, CUTIP
December 2017

Table 1: IOC content validity assessment of the item statements to measure organisational innovativeness of public/government agencies
(Total of 8 factors, 20 Sub-factors and 60 item statements)

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--|-------------------|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| D1: CULTURE Culture innovativeness (4 Sub-Factors 9 Items) | IN1 Creativity | (IT01) In this organisation, staff are always encouraged to come up with new ideas and original approaches when dealing with problems in the workplace. | | | | |
| | | (IT02) This organisation constantly innovates in order to deliver new and better outputs and improved services to the public. | | | | |
| | IN02 Openness | (IT03) This organisation tolerates individuals who do things in a different way. | | | | |
| | | (IT04) In this organisation, staff can challenge the status quo of how things are done without being penalised. | | | | |
| | | (IT05) In this organisation, staff are encouraged to communicate at all levels across different departments in order to share ideas, discuss best practices, report errors and failures as a way to improve the organisation. | | | | |
| | IN03 | (IT06) | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--|---|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | Risk taking and perception | In this organisation, staff are encouraged to explore and tryout in order to find new ways of doing things and learn from their mistakes, knowing well that some will fail. | | | | |
| | | (IT07) This organisation provides supportive mechanisms, incentives, and rewards for all staff to take risks in order to perform better in their jobs. | | | | |
| | IN04 New public management values and governance | (IT08) This organisation is constantly streamline internal operations and work processes to be more efficient and become less bureaucratic. | | | | |
| D2: LDR Leadership innovativeness (2 Sub-Factors 6 Items) | IN05 Transformation leadership | (IT09) This organisation can be described as flexible and continually adapting to changes and challenges. | | | | |
| | | (IT10) Top leaders and executives of this organisation always treat staff as individuals, give advices and encouragements, and support their developments. | | | | |
| | (IT11) Top leaders and executives of this organisation often provide their ministers and government with frank and experts advices | | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|------------------------------------|--|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | | based on research and evidences. | | | | |
| | | (IT12) Top leaders and executives of this organisation often keep employees informed and involved in important decision making processes. | | | | |
| | IN06 Leadership commitment to innovation | (IT13) Top leaders and executives of this organisation act as catalysts of constructive changes and seek to remove barriers for the organisation to succeed. | | | | |
| | | (IT14) Top leaders and executives of this organisation provide opportunities, tools, and supporting environment for the employees to be innovative and able to succeed in their jobs. | | | | |
| | | (IT15) Top leaders and executives of this organisation are genuinely committed to operate the organisation with integrity to serve the public and create positive social impact. | | | | |
| D3:STGY Strategy innovativeness | IN07 Strategic initiations towards innovation | (IT16) New opportunities and societal challenges are often recognised and successfully integrated into the organisation | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|----------------------------|----------------------------------|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| (2 Sub-Factors 6 Items) | | strategic plans and project operations. | | | | |
| | | (IT17) Innovation development and promotion are part of strategic missions and mandates of this organisation. | | | | |
| | | (IT18) The strategic goals, objectives, mandates, and policies of this organisation are shared and understood by all the staff and any changes are always articulately conveyed to all employees. | | | | |
| | | (IT19) Top executives of this organisation develop clear view of ambitious and achievable final aims more than less significant short-term objectives. | | | | |
| | IN08 Strategic follow-through | (IT20) In this organisation, employee work goals are clearly defined against measureable criteria and are aligned to the organisation's objectives and KPIs. | | | | |
| | | (IT21) In this organisation, there are effective strategic follow-through mechanisms and operations to support unexpected changes of top government policies, priorities, or mandates. | | | | |
| D4: WORK | IN09 | (IT22) | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--|---------------------------|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| Workforce innovativeness (2 Sub-Factors 7 Items) | Motivated workforce | In this organisation, employees are willing to put in a great deal of effort beyond that normally required in order to help this organisation to be successful and competitive. | | | | |
| | | (IT23) In this organisation, employees believe that their hard work and achievements are justly recognised, appreciated, and well rewarded. | | | | |
| | | (IT24) In this organisation, employees are constantly motivated and self-driven to deliver better services, improved outputs, and values to the public. | | | | |
| | IN10 Capable workforce | (IT25) Most of this organisation workforce is educated to post-graduated levels of master or doctoral degrees. | | | | |
| | | (IT26) In this organisation, employees are highly skilled with relevant expertise suitable to their job descriptions and duties. | | | | |
| | | (IT27) In this organisation, employees often have opportunities to participate in trainings, workshops, and further education that suit their | | | | |
| | | | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|---|---|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | | interests to improve their skills and knowledge. | | | | |
| | | (IT28) In this organisation, employees are generally recognised as very talented and highly capable in their jobs by other organisations. | | | | |
| D5: INFRA Infrastructure & resource innovativeness (3 Sub-Factors 8 Items) | IN11 Budget & fund for innovation | (IT29) This organisation has sufficient budgets or funds allocated specifically to continually develop new initiatives and better programmes, products, processes, and services to the public. | | | | |
| | | (IT30) This organisation has sufficient budgets or funds allocated specifically to continually improve internal work processes, practices, and operations of the organisation. | | | | |
| | IN12 R&D for innovation | (IT31) This organisation invests in in-house R&D unit steered by a dedicated and capable group of personnel and experts that continues to introduce new products and improved services to the public. | | | | |
| | | (IT32) This organisation hires and/or collaborates with external experts in conducting R&D activities to develop new | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--------------------|----------------------------|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | | and better outputs of products and services to the public. | | | | |
| | IN13 ICT & e-government | (IT33) This organisation is able to provide and maintain reliable and secure computer network, fast internet broadband access, and high quality Wi-Fi connections for all employees at all times. | | | | |
| | | (IT34) This organisation has efficient and reliable ICT division that is always capable of helping its employees with computer usage and other ICT related problems. | | | | |
| | | (IT35) This organisation established its official website in local and English languages and regularly updates it with current organisation projects, latest activities, news, latest products and services, publications, management structure, and staff contact details. | | | | |
| | | (IT36) This organisation makes full use of available information and communication technologies, social media platforms and mobile phone applications to improve daily operation, widen | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|---|--------------------------------|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | | public engagement, and improve services. | | | | |
| D6: MNG Management innovativeness (2 Sub-Factors 7 Items) | IN14 Management practice | (IT37) This organisation has instruments e.g. manuals, databases, files, organisational routines that allow what has been learnt in the past situations or projects to remain valid and help the work processes to operate smoothly and effectively, although the employees are no longer the same. | | | | |
| | | (IT38) Management of this organisation promotes cross-functional teamwork among different departments/units within the organisation in order to share expertise and achieve the best results and outcomes. | | | | |
| | | (IT39) In this organisation, employees are well placed in positions and divisions suitable to their responsibilities, capabilities and skills. | | | | |
| | | (IT40) The management structure of this organisation is of suitable size, hierarchy, and chains of commands that can effectively carry out the organisational functions and mandates as well as quickly | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|---|---|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | | response to changes in plans, strategies, and operations. | | | | |
| | IN15 Management capability | (IT41) In this organisation, management and human resource department are capable of developing, promoting and retaining talented or high performing employees. | | | | |
| | | (IT42) In this organisation, management can often provide useful insights, feedbacks and comments that help to identify potential opportunities and eliminate problems. | | | | |
| | | (IT43) In this organisation, management ensures that new work processes and developments that may be helpful to the organisation as a whole are usually discussed and shared with all employees. | | | | |
| D7: PERFORM Performance Innovativeness | IN16 Innovative results, outputs, and outcomes | (IT44) In the last three years, this organisation has consistently produced innovative outputs such as new and improved products and services, | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|-----------------------------|-----------|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| (3 Sub-Factors 11 Items) | | new patents, new designs and copyrights, new programmes, new initiatives, projects, and policies. | | | | |
| | | (IT45) In the last three years, this organisation has consistently produced high number of research articles in well-respected national and international journals as well as other high quality publications such as official reports, white papers, and newsletters etc. that help enhance public knowledge. | | | | |
| | | (IT46) In this last three years, this organisation has consistently achieved its annual targets, objectives, and KPIs. | | | | |
| | | (IT47) In the last three years, in comparison with other peer organisations with similar functions and mandates <i>in the same country</i> , this organisation consistently outperforms them. | | | | |
| | | (IT48) In the last three years, in comparison with other peer organisations with similar functions and mandates <i>internationally or globally</i> , this organisation consistently outperforms them. | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--------------------|--|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | IN17 New methods/ processes that improve organisation's productivity, capability, and performance | (IT49) In the last three years, this organisation consistently commit to routinely track and communicate its results and performances to external stakeholders via e.g. annual reports, stakeholders meetings, online discussion forums, network meetings, conferences and seminars etc. | | | | |
| | | (IT50) In the last three years, this organisation has successfully updated existing internal work processes and operational methods that result in improvement of organisational effectiveness, efficiency, productivities, and performance. | | | | |
| | | (IT51) In the last three years, this organisation has routinely conducted users' satisfactory surveys measuring the organisational performances and successfully utilised the results to improve existing operations and practices. | | | | |
| | IN18 Efficient, effective, and impartial evaluation | (IT52) This organisation has effective and efficient performance measurement system in | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|---|--|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | mechanism and performance reward system | place (e.g. balanced scorecard, management dashboard, report card, and KPI tracking etc.) that are utilised and followed-through by all employees in order to monitor and ensure that the mission and vision of success are linked and translated to actual organisational unit activities and operations. | | | | |
| | | (IT53) In the last three years, this organisation has effectively and efficiently utilised independent, and impartial <i>internal audit department</i> that constantly monitors, evaluates, and provides feedbacks and recommendations to improve daily operations and performance of all organisational division units. | | | | |
| | | (IT54) In the last three years, this organisation has been successfully complied to independent and impartial <i>external audit and/or panel of experts</i> that evaluates its targets, KPIs and performance. | | | | |
| D8:NETLI NK Network and External Linkage | IN19 Collaborative networks and cooperation with other agencies | (IT55) This organisation establishes and able to maintain good <i>national</i> collaborative networks and research cooperation | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--|---|--|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| Innovativeness (2 Sub-Factors 6 Items) | | with other innovative organisations. | | | | |
| | | (IT56) This organisation establishes and able to maintain good <i>international</i> collaborative networks and research cooperation with other innovative organisations. | | | | |
| | | (IT57) This organisation engages with and benefits from cross-sectoral collaborative partnerships with other public agencies, private business enterprises, universities and non-profit organisations. | | | | |
| | IN20 Favourable external contexts for innovation | (IT58) This organisation fully benefits from national and/or local government policies and regulations that promote innovations and innovation related activities. (Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units). | | | | |
| | | (IT59) This organisation is consistently able to receive external financial | | | | |
| | | | | | | |

| Dimension / Factor | Indicator | Item statement | Validity | | | Comment |
|--------------------|-----------|---|----------|---|----|---------|
| | | | +1 | 0 | -1 | |
| | | <p>supports, from the national and/or local governments and/or private businesses or foundations to invest in innovations and innovation related activities.</p> <p>(Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units).</p> | | | | |
| | | <p>(IT60) Government policies, laws and regulations, and political mandates and climates help foster innovation and innovation related activities in this organisation.</p> | | | | |

APPENDIX 6A

Questionnaire for the survey Organisational innovativeness of public agencies

Part 1: Introduction

The purpose of this survey is to assess organisational innovativeness of public or government agencies. The survey is part of an on-going research at Technopreneurship and Innovation Management Programme, Graduate School, Chulalongkorn University, Bangkok, Thailand. Part of the survey is also about public perception of the ASEAN Committee on Science and Technology (ASEAN COST) and its associated groups.

It should take around 15-20 minutes to answer all the questions.

This survey requires no detailed personal information regarding you or your organisation. Your inputs and answers cannot and will not be traced back to you. The main purpose is to compare the organisational innovativeness of public or government agencies in different countries at the national and regional levels.

For every return completed survey, the researcher is pledged to donate 20 Thai Bahts or approximately USD0.60 to support education and learning activities of children in poor urban slums in Thailand and Malaysia. Please help complete this survey for academic research contribution and participate in goodwill charitable causes. Thank you for completing the survey. Your contributions are very much appreciated. The online link to this survey is at <https://www.surveymonkey.com/r/XFDKLSF>. If you have further enquiry, please contact the researcher at APOINTsurvey@gmail.com.

Part 2: Survey participant information

Q1. What is your gender?

- Male Female Others

Q2. What is your age?

- Below 25 years old
 25-35 years old
 36-45 years old
 46-55 years old
 56-65 years old
 More than 65 years old

Q3. What is your current employment position level?

- Top executive director, deputy director, or equivalent
- Middle management
- Senior employee
- Junior employee
- Student/ Training
- Self-employed business owner
- Unemployed
- Retired/ senior citizen

Q4. How long have you been in your current position?

- Less than 1 year
- 1-3 years
- 4-6 years
- More than 6 years

Q5. How long have you been with your organisation?

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-20 years
- More than 20 years

Q6. What is your highest education qualification?

- Ph.D.
- Master's degree
- Bachelor's degree
- Below Bachelor's degree

Q7. What are your areas of expertise and formal qualifications? (More than one answer can be selected)

- Science, technology, engineering, and mathematics (STEM)
- Healthcare and medicine
- Industry, trading, and manufacturing
- Education and teaching
- Economy, finance, and accountancy
- Management and business administration
- Politics and public policy
- Laws and security enforcement

- Social studies (including arts, culture, history, sports, media, and entertainment)
- Others (Please specify) _____

Part 3: Factors contributing to innovative public organisation

Definitions of **innovation in public organisation** and **organisational innovativeness**

***Innovation in public organisation** is the introduction, adoption, and implementation of a new idea, strategy, management practice, communication process, or operational method, which result in a new development, improved output, outcome, and performance of the organisation. The impact of such innovation can result in better quality service delivery, increase efficiency, policy effectiveness, and values to the society.*

***Organisational Innovativeness** is the overall tendency or propensity for the organisation to innovate and the capability of the organisation to introduce and manage their innovative activities, processes, practices, and cultures that improve its operations, performance, and competitiveness.*

In general, innovation must have occurred for an organisation to be considered innovative. However, for innovation to occur the organisation must possess certain characteristics that are conducive to innovation. Therefore, in this case innovativeness is precursor to innovation.

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Q8. How important are the following factors contributing to innovative public/government organisation? Please rate each factor on a scale of 1-5 by marking X in which:

- 1 = Not at all important
- 2 = Not important
- 3 = Slightly important
- 4 = Important
- 5 = Very important.

| Factor | Rating | | | | |
|--|--------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| (F1): Innovative culture of creativity, openness, learning organisation, risk taking and failure tolerance, non-bureaucratic and efficient businesslike practices. | | | | | |
| (F2): Organisation leader's positive attitude towards innovation, attention, support, and communication to workforce, and ability to direct and transform the organisation to success. | | | | | |
| (F3): Strategic plans and initiations to foster innovation and follow-through mechanism to achieve organisation final aims and mitigate negative changes. | | | | | |
| (F4): Motivated and talented workforce that are willing to learn, with capacity, capability, and competency to perform well in their jobs, and effectively contribute to the organisation targets and achievements. | | | | | |
| (F5): Sufficient resources and infrastructure for innovation include budgets, funds, R&D investments, make full use of available ICT and social platforms, and readiness for e-government and digital economy. | | | | | |
| (F6): Management practices and capability to foster innovation include knowledge and workforce management that lead to improved operations, work processes, and better outcomes. | | | | | |
| (F7): Innovative performance management and monitoring system include benchmarking innovative outputs and outcomes to other peer organisations nationally and globally, achieving annual targets and KPIs, and effectively utilising stakeholders' feedbacks to improve services and performance. | | | | | |
| (F8): Collaborative network and favorable external contexts for innovation include effective utilisation of network and cooperation with other innovative organisations from other sectors and ensuring that the organisation benefits from government policies, initiatives, laws, and regulations that help foster innovation. | | | | | |

Part 4: Organisation information

Q9. What country is your organisation or agency located in?

- Brunei Darussalam
- Cambodia
- Indonesia
- Lao PDR
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Vietnam

Q10. What sector is your organisation?

- Public / Government sector
- Academic/ Education sector
- Private business sector
- Non-government organisation (NGO)
- Others (Please specify) _____

Q11. Please provide the name of your organisation (optional).

Q12. In what following sector areas are your organisation main functions and mandates associated with? (Can choose more than one answer)

- Science, technology, and innovation (STI)
- Information and communication technology (ICT)
- Public administration and service
- Education and teaching
- Culture, tourism, history, and arts
- Sport and entertainment
- Industry manufacturing and production
- Energy sector
- Agriculture and food
- Healthcare and medicine
- Natural resources and environment
- Law, military and national security
- Financial and economic sector
- Foreign relations and diplomat sector
- Non-government organisation (NGO)
- Others (Please specify) _____

Q13. Are the functions and mandates of your organisation related to the development and promotion of science, technology, and innovation (STI) activities?

- Yes No

Q14. How many staff in total are there in your organisation?

- 1 – 50
 51- 100
 101 – 200
 201 – 400
 401 –700
 701 –1000
 1,001 – 2000
 More than 2000

Q15. Is your organisation a public or government agency?

In this survey, your organisation is considered a public or government agency if it receives most of the budgets and funds from the national, local, or state government.

- Yes No

If your answer is Yes in Q15 then you are working in public organisation, please continue to Q16 and the rest of the survey below.

If your answer is No in Q15 then you are not working in public organisation, please skip Part 5: Measuring organisational innovativeness of your organisation and continue to Q20 in Part 6: Public perception of ASEAN COST and associated groups.

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Part 5: Measuring organisational innovativeness of your organisation

Q16. If your organisation a public or government agency, at what organisational level do you consider your agency to be?

- National/ state ministry level or equivalent
 An agency under a national/ state ministry level or equivalent
 A division under an agency under a national/ state ministry level or equivalent
 Others (Please specify) _____

Q17. What type of public or government agency is your organisation?

- International government agency (e.g. ASEAN Secretariat)
- Civil government agency (e.g. central administration office in a ministry)
- State-owned enterprise
- Government public corporation
- Autonomous or Independent public organisation
- Others (Please specify) _____

Q18. What are your motivations or reasons for working in public/government agency?

More than one answer can be selected.

- Job security
- Altruism – wanting to serve the public
- Attractive salary or income
- Career progression
- Health insurance package and/or other benefits
- Opportunities for further training and education
- Fulfilling scholarship bonds/contracts
- Others (Please specify) _____

Q19. Please select X the scale from 1-5 to the following statements that you believe to be the most reflective of your organisation in which:

1 = Strongly disagree or not relevant

2 = Disagree

3 = Slightly agree

4 = Agree

5 = Strongly agree with the statement

| Question | Item statement | Scale 1-5 | | | | |
|----------|---|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT01 | Employees in my organisation are always encouraged to come up with new ideas and original approaches when dealing with problems in the workplace. | | | | | |
| IT02 | My organisation is constantly seeking to be creative and innovative in order to deliver new and better outputs and improved services to the public. | | | | | |
| IT03 | My organisation tolerates individuals who do things in a different way. | | | | | |
| IT04 | Employees can reasonably challenge the status quo of how things are done without being penalised. | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|--|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT05 | Employees are encouraged to communicate at all levels across different departments in order to share ideas, discuss best practices, report errors and failures as a way to improve the organisation. | | | | | |
| IT06 | Employees are encouraged to explore and try new ways of doing things to learn from their mistakes, knowing well that some will fail. | | | | | |
| IT07 | My organisation provides supportive mechanisms, incentives, and rewards for all staff to take reasonable risks in order to perform better in their jobs. | | | | | |
| IT08 | My organisation constantly streamlines internal operations and work processes in order to be more efficient and become less bureaucratic. | | | | | |
| IT09 | My organisation can be described as flexible and continually adapting to changes and challenges. | | | | | |
| IT10 | Top leaders of my organisation treat staff as individuals, give encouragements, and support their developments. | | | | | |
| IT11 | Top leaders of my organisation provide their ministers and government with frank expert advices based on research and supporting indications. | | | | | |
| IT12 | Top leaders of my organisation often keep employees informed and involved in important decision making processes. | | | | | |
| IT13 | Top leaders of my organisation act as catalysts of constructive changes and seek to remove barriers for the organisation to succeed. | | | | | |
| IT14 | Top leaders of my organisation provide opportunities, tools, and supporting environment for the employees to be innovative and able to succeed in their jobs. | | | | | |
| IT15 | Top leaders of my organisation are genuinely committed to operate the organisation with | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|---|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | integrity to serve the public and create positive social impact. | | | | | |
| IT16 | New opportunities and societal challenges are effectively recognised and successfully integrated into the organisation strategic plans and project operations. | | | | | |
| IT17 | Innovation development and promotion are part of strategic missions and mandates of my organisation. | | | | | |
| IT18 | The strategic goals, mandates, and policies of my organisation are shared and articulately conveyed to all employees. | | | | | |
| IT19 | Top leaders of my organisation develop clear view of ambitious and achievable final aims more than less significant short-term objectives. | | | | | |
| IT20 | In my organisation, employee work goals are clearly defined against measureable criteria and are aligned to the organisation's objectives and KPIs. | | | | | |
| IT21 | In my organisation, there are effective strategic follow-through mechanisms and operations to support unexpected changes of government policies, priorities, or mandates. | | | | | |
| IT22 | Employees in my organisation are willing to put in a great deal of effort beyond that normally required in order to help the organisation to be successful and competitive. | | | | | |
| IT23 | Employees in my organisation believe that their hard work and achievements are justly recognised, appreciated, and well rewarded. | | | | | |
| IT24 | Employees in my organisation are constantly motivated and self-driven to deliver better services and improved results to the public. | | | | | |
| IT25 | Employees in my organisation are highly skilled with competency and relevant expertise suitable to their job requirements and duties. | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|--|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT26 | Employees in my organisation often have opportunities to participate in trainings and further education that suit their needs and interests in order to improve their skills and knowledge. | | | | | |
| IT27 | Employees in my organisation are generally recognised as very talented and highly capable in their jobs by other organisations with similar functions. | | | | | |
| IT28 | My organisation has sufficient budgets or funds purposely allocated to continually develop new initiatives and better programmes, products, processes or services to the public. | | | | | |
| IT29 | My organisation has sufficient budgets or funds specifically allocated to continually improve internal work processes, practices, and operations of the organisation. | | | | | |
| IT30 | My organisation invests in in-house research and development (R&D) unit that effectively produce new outputs and deliver better results. | | | | | |
| IT31 | My organisation hires and/or collaborates with external experts in R&D activities in order to develop new projects and better products or services to the public. | | | | | |
| IT32 | My organisation provides reliable and secure computer network, fast internet broadband access, and satisfactory high quality Wi-Fi connections for all employees at all times. | | | | | |
| IT33 | My organisation constantly provide all employees with reliable assistance in computer usages and solving ICT related problems. | | | | | |
| IT34 | My organisation has official website in local and English languages and regularly updates it with current projects, up to date news, latest products and services, publications, organisational structures, and contact details in | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|---|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | order to inform and engage with the public nationally and globally. | | | | | |
| IT35 | My organisation makes full use of available information and communication technologies, social media platforms, and mobile phone applications to improve daily operations and widen public engagement. | | | | | |
| IT36 | My organisation has instruments (e.g. manuals, databases, and organisational procedures) that allow what has been learnt in the past to remain valid and help smoothen work operations although the employees are no longer the same. | | | | | |
| IT37 | Management of my organisation promotes cross-functional teamwork among different divisions in order to share expertise and achieve the best results and outcomes. | | | | | |
| IT38 | Employees of my organisation are well placed in positions or ranks suitable to their responsibilities, capabilities and skills. | | | | | |
| IT39 | The management structure of my organisation is of suitable size and chains of commands that can effectively carry out the organisational functions as well as quickly respond to changes in plans, strategies, and operations. | | | | | |
| IT40 | Management and human resource units of my organisation are capable of developing, promoting and retaining talented or high performing workforces. | | | | | |
| IT41 | Management of my organisation can often provide useful insights, feedbacks and comments that help to identify potential opportunities and eliminate problems. | | | | | |
| IT42 | Management of my organisation ensures that new work processes and developments that may be helpful to the organisation as a whole are usually discussed and shared with all employees. | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|--|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT43 | In the last three years, my organisation has consistently produced satisfactory innovative outputs such as new and improved products and services, patents, designs, copyrights, projects, programmes, and policies to serve the public. | | | | | |
| IT44 | In the last three years, my organisation has consistently published a number of research articles in referenced national and international journals as well as other high quality publications such as official reports, white papers, and newsletters that help enhance society awareness and public knowledge. | | | | | |
| IT45 | In the last three years, my organisation has consistently achieved its annual set targets and KPIs. | | | | | |
| IT46 | In the last three years in comparison with other peer organisations with similar functions and mandates <i>in the same country</i> , my organisation consistently outperforms them. | | | | | |
| IT47 | In the last three years, in comparison with other peer organisations with similar functions and mandates <i>internationally or globally</i> , my organisation consistently outperforms them. | | | | | |
| IT48 | In the last three years, my organisation routinely and effectively benchmarks and communicates its results and performances to external stakeholders via annual reports, stakeholders meetings, online discussion forums, network meetings, conferences and seminars. | | | | | |
| IT49 | In this last three years, my organisation routinely updates existing internal work processes and operations that result in improvement of organisational efficiency, productivity, and performance. | | | | | |
| IT50 | In the last three years, my organisation routinely conducts stakeholders' and/or users' | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|---|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | satisfactory surveys and effectively utilises the feedbacks to improve the existing operation, practice, and performance. | | | | | |
| IT51 | My organisation has effective and efficient performance measurement system in place (e.g. balanced scorecard, management dashboard, report card, and KPI tracking system) that are utilised and followed-through by all employees to monitor and ensure that the mission and vision of success are linked and translated to actual organisational unit activities and operations. | | | | | |
| IT52 | In the last three years, my organisation has effectively and efficiently utilised independent, and impartial <i>internal audit department</i> that constantly monitors, evaluates, and provides feedbacks and recommendations to improve daily operations and performance of all organisational units. | | | | | |
| IT53 | In the last three years, my organisation has been successfully complied with independent and impartial <i>external audit and/or panel of experts</i> that evaluates its targets, KPIs and performance. | | | | | |
| IT54 | My organisation establishes, maintains, and effectively utilises <i>national</i> collaborative networks and research cooperation with other innovative organisations. | | | | | |
| IT55 | My organisation establishes, maintains, and effectively utilises <i>international</i> collaborative networks and research cooperation with other innovative organisations. | | | | | |
| IT56 | My organisation engages with and benefits from cross-sectoral collaborative partnerships with other public agencies, private business enterprises, universities and non-profit organisations. | | | | | |
| IT57 | My organisation fully benefits from national and/or local government policies and | | | | | |

| Question | Item statement | Scale 1-5 | | | | |
|----------|--|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | regulations that promote innovations and innovation related activities. (Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units). | | | | | |
| IT58 | My organisation is consistently able to receive external supports from the national and/or local governments and/or private businesses or foundations to invest in innovation related activities. | | | | | |
| IT59 | Government policies, laws, regulations, and political mandates and climates help foster innovation and innovation related activities in my organisation. | | | | | |

Part 6: Public perception of ASEAN COST and associated groups

Q20. Have you heard of, attended meetings, or collaborated with ASEAN Committee on Science and Technology (ASEAN COST) and ASEAN Ministerial Meeting on Science and Technology (AMMST)?

- Yes No

Q21. Have you heard of, attended meetings, or collaborated with any of the following subsidiaries associated with ASEAN COST? More than one answer can be selected.

- BAC (Boards of Advisors to COST)
- ABAPAST (Advisory Body of the ASEAN Plan of Action on Science and Technology)
- ABASF (Advisory Body of the ASEAN Science Fund)
- Krabi Initiative
- APASTI 2016-2025 (ASEAN Plan of Action on Science, Technology and Innovation)
- SCB (Sub-Committee on Biotechnology)
- SCFST (Sub-Committee on Food Science and Technology)
- SCIRD (Sub-Committee on S&T Infrastructure and Resources Development)
- SCMG (Sub-Committee on Meteorology and Geophysics)

- SCMIT (Sub-Committee on Microelectronics and Information Technology)
- SCMSAT (Sub-Committee on Marine Science and Technology)
- SCMST (Sub-Committee on Material Science and Technology)
- SCSER (Sub-Committee on Sustainable Energy Research)
- SCOSA (Sub-Committee on Space Technology and Applications)
- Others (Please specify) _____
- No, I have never heard of, attended meetings, or collaborated with any

ASEAN COST associated subsidiaries above.

Q22. Have you ever heard of, attended meetings, or collaborated with any of the following dialogue partners associated with ASEAN COST? More than one answer can be selected.

- ASEAN-China JSTC (Joint Science and Technology Committee)
- ASEAN-EU DST (Dialogue on Science and Technology)
- ASEAN-India WGST (Working Group on Science and Technology)
- ASEAN-Japan CCST (Cooperation Committee on Science and Technology)
- ASEAN-ROK JSTC (Joint Science and Technology Committee)
- ASEAN-Russia WGST (Working Group on Science and Technology)
- ASEAN-US CST (Consultation on Science and Technology)
- ASEAN COST+3 (ASEAN COST Plus China, Japan and ROK)
- Others (Please specify) _____
- No, I have never heard of, attended meetings, or collaborated with any of the above dialogue partners associated with ASEAN COST.

Q23. Have you ever heard of, attended meetings, or collaborated with any of the following networks and centres established under ASEAN COST? More than one answer can be selected.

- TTF-TW (Technical Task Force on Tsunami Warning under SCMG)
- TWG-NPP (Technical Working Group on Nuclear Power Plant under SCSER)
- EGM (Experts Group on Metrology under SCIRD)
- ASEAN Large Nuclear and Synchrotron Network
- ASEAN Network for Nuclear Power Safety Research
- ASEAN Network on Microbial Utilization (AnMicro)
- ASEAN Network for Drugs, Diagnostics and Vaccines Innovation (ASEAN-NDI)
- ASEAN Hydroinformatics and Climate Data Center (AHC)
- ASEAN Research and Training Centre for Space Technology and Applications (ARTSA)
- ASEAN Specialised Meteorology Centre (ASMC)

- ASEAN Earthquake Information Centre (AEIC)
- ASEAN Journal for S&T Development (AJSTD)
- ASEAN Science Technology and Innovation Week (ASTIW)
- ASEAN Food Conference
- ASEAN Climate Outlook Forum (ASEANCOF)
- Others (Please specify) _____
- No, I have never heard of, attended meetings, or collaborated with any of the above ASEAN COST networks and centres.

Q24. If answer Yes to any of the previous questions, how did you know ASEAN COST or any of the associated groups? More than one answer can be selected.

- I used to attend ASEAN COST, AMMST, sub-committees or related group meetings.
- I used to be representative of at least one or more of ASEAN COST entities.
- I used to work or collaborate with ASEAN COST entities.
- My organisation used to collaborate with ASEAN COST entities.
- My organisation used to receive funding or grants from ASEAN COST.
- My organisation used to provide funding or grants to ASEAN COST.
- I heard of ASEAN COST and associated entities via my friends or colleagues.
- I heard of ASEAN COST and AMMST meetings via news channels such as TV, radios, newspapers, internet, and social media etc.
- Others (Please specify) _____
- No, I have never attended meetings or collaborated with ASEAN COST and associated groups.

Q25. If you have previously attended meetings or worked with ASEAN COST projects and associated groups, how do you rate the most recent performance and outcome of such cooperation?

- The performance and outcome of the cooperation are not satisfactory.
- The performance and outcome of the cooperation are somewhat satisfactory.
- The performance and outcome of the cooperation are very satisfactory.
- Not applicable (I have never worked or collaborated with ASEAN COST).

Q26. Please provide the name of the project or the meeting that your rating referred to.

Q27. In which of the following areas do you think ASEAN COST and associated groups can be improved to achieve its goals and better serve the public? More than one answer can be selected.

- ASEAN COST and associated groups should be more open and provide easier access channels for public and private sector engagements and collaborations.
- ASEAN COST and associated groups should have performance measurement system to indicate whether their policies, programmes, and projects are creating desirable positive output, outcome and impact to the public.
- ASEAN COST and associated groups should have performance assessments to indicate whether they are operating effectively and efficiently.
- There should be an online system or platform to help ASEAN COST members and the ASEAN Secretariat keep track and monitor the projects' progresses, targets, and KPIs.
- The results, outcomes, and impacts of ASEAN COST main projects should be publicly available and open to public feedbacks and comments.
- S&T Division at the ASEAN Secretariat as pivotal coordination centre of ASEAN COST should be empowered with more workforce and resources.
- ASEAN COST and associated groups should have more online-meetings to collaborate and exchange opinions in order to reduce the duration of annual meeting events.
- Others (Please suggest) _____

Thank you for participating in this survey. Please return your completed questionnaire to APOINTsurvey@gmail.com.

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APPENDIX 6B**แบบสอบถามความคิดเห็นสำหรับการสำรวจออนไลน์
ระดับความเป็นนวัตกรรมขององค์กรภาครัฐ****ส่วนที่ 1: บทนำ**

จุดประสงค์ของแบบสอบถามความคิดเห็นนี้จัดทำขึ้นเพื่อประเมินระดับความเป็นนวัตกรรมขององค์กรภาครัฐ การสำรวจนี้เป็นส่วนหนึ่งของงานวิจัยที่จัดทำขึ้นโดยหลักสูตรสาขาธุรกิจเทคโนโลยีและการจัดการนวัตกรรม บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย ส่วนหนึ่งในการสำรวจนี้ครอบคลุมการรับรู้ของสาธารณชนต่อผลการดำเนินงานและประสิทธิภาพของคณะกรรมการอาเซียนด้านวิทยาศาสตร์และเทคโนโลยี (ASEAN Committee on Science and Technology - COST) และเครือข่ายคณะทำงานต่างๆ ที่เกี่ยวข้อง

แบบสอบถามนี้ใช้เวลาในการทำประมาณ 15-20 นาที ข้อมูลที่ได้รับจะใช้เพื่อประโยชน์ในการทำวิจัยเพื่อเปรียบเทียบระดับความเป็นนวัตกรรมขององค์กรภาครัฐในประเทศไทยและประเทศสมาชิกอาเซียนเท่านั้น และจะไม่เปิดเผยชื่อองค์กรที่ร่วมตอบแบบสอบถามต่อสาธารณะ

สำหรับทุกแบบสอบถามที่ได้รับกลับคืนมาและตอบคำถามครบทุกข้อ ผู้ทำวิจัยจะบริจาคเงินสนับสนุนสนับสนุนกิจกรรมส่งเสริมการศึกษาและการเรียนรู้ของเด็กที่ด้อยโอกาสในชุมชนแออัดในประเทศไทย และประเทศมาเลเซียเป็นจำนวนเงิน 20 บาท ต่อแบบสอบถาม กรุณาช่วยสละเวลาตอบแบบสอบถามนี้เพื่อประโยชน์ในการทำวิจัยของประเทศไทย และร่วมทำบุญต่อเด็กด้อยโอกาส ความเห็นของท่านจากทุกแบบสอบถามที่ได้รับมีคุณค่าอย่างยิ่ง

ผู้ทำวิจัยขอขอบพระคุณทุกท่านที่ร่วมตอบแบบสอบถามมา ณ ที่นี้ และกรุณาช่วยเผยแพร่ส่งต่อแบบสอบถามนี้ไปยังองค์กรและหน่วยงานของรัฐในประเทศไทยและประเทศสมาชิกอาเซียนได้ที่ออนไลน์ลิงค์ของแบบสอบถามภาษาอังกฤษ <https://www.surveymonkey.com/r/XFDKLSF> และแบบสอบถามภาษาไทยที่ <https://www.surveymonkey.com/r/LJFLQJW>

หากท่านมีข้อสงสัยหรือคำถามเพิ่มเติม กรุณาติดต่อผู้ดำเนินการวิจัยได้ที่ Email:

APOINTsurvey@gmail.com.

ส่วนที่ 2: ข้อมูลผู้ตอบแบบสอบถาม

Q1. เพศของคุณคือ?

- ชาย หญิง อื่นๆ

Q2. ปัจจุบันคุณอายุเท่าใด?

- ต่ำกว่า 25 ปี
 25-35 ปี
 36-45 ปี
 46-55 ปี
 56-65 ปี
 มากกว่า 65 ปี

Q3. ปัจจุบันคุณดำรงตำแหน่งอะไร?

- ผู้นำหรือผู้บริหารระดับสูงสุดขององค์กร ผู้นำหรือผู้บริหารระดับรองต่อจากผู้นำสูงสุด หรือเทียบเท่า
 ผู้บริหารระดับกลาง หรือเทียบเท่า
 พนักงานระดับอาวุโส ลูกจ้างระดับชำนาญการ หรือเทียบเท่า
 พนักงานระดับกลาง-เริ่มต้น ลูกจ้างระดับปฏิบัติการ หรือเทียบเท่า
 นักเรียน นักศึกษา
 ผู้ประกอบการ หรือเจ้าของธุรกิจส่วนตัว
 ผู้ว่างงาน
 ผู้เกษียณงาน

จุฬาลงกรณ์มหาวิทยาลัย
 CHULALONGKORN UNIVERSITY

Q4. คุณดำรงตำแหน่งปัจจุบัน หรืออยู่ในภาวะปัจจุบันนี้มาเป็นระยะเวลาานานเท่าใด?

- น้อยกว่า 1 ปี
 1-3 ปี
 4-6 ปี
 มากกว่า 6 ปี

Q5. คุณทำงานในองค์กรนี้มาเป็นระยะเวลาานานเท่าใด?

- น้อยกว่า 1 ปี
 1-5 ปี
 6-10 ปี

- 11-20 ปี
- มากกว่า 20 ปี

Q6. ระดับการศึกษาสูงสุดของคุณคือ?

- ระดับปริญญาเอก
- ระดับปริญญาโท
- ระดับปริญญาตรี
- ต่ำกว่าระดับปริญญาตรี

Q7. คุณมีประสบการณ์ทำงาน ความรู้ความเชี่ยวชาญ และคุณวุฒิเกี่ยวข้องกับด้านใด? (เลือกตอบได้มากกว่า 1 คำตอบ)

- วิทยาศาสตร์ เทคโนโลยี วิศวกรรมศาสตร์ และคณิตศาสตร์ (STEM)
- การแพทย์ สุขภาพ เกษษศาสตร์ และสาธารณสุข
- อุตสาหกรรม ธุรกิจการค้า และการผลิต
- การศึกษา และการฝึกอบรม
- เศรษฐศาสตร์ การเงินการธนาคาร พาณิชยศาสตร์และการบัญชี
- การบริหารธุรกิจ และการจัดการ
- รัฐศาสตร์ การเมือง และนโยบายสาธารณะ
- กฎหมาย ความมั่นคงและความปลอดภัย
- สังคมศาสตร์ (ศิลปะ วัฒนธรรม ประวัติศาสตร์ กีฬา สื่อ และความบันเทิง)
- อื่นๆ (โปรดระบุ) _____

ส่วนที่ 3: ประเมินความสำคัญของปัจจัยส่งเสริมความเป็นนวัตกรรมขององค์กรภาครัฐ

คำอธิบายความหมาย นวัตกรรมในองค์กรภาครัฐ (Innovation in public organisation) และความเป็นนวัตกรรมขององค์กร (Organisational innovativeness)

Q8. คุณคิดว่าปัจจัยเหล่านี้มีความสำคัญเพียงใดต่อความเป็นนวัตกรรมขององค์กรภาครัฐ โปรดเลือกคะแนน 1 – 5 โดย

นวัตกรรมในองค์กรภาครัฐ (Innovation in public organisation)

หมายถึงการริเริ่ม การปรับเปลี่ยน การนำมาใช้ และการปฏิบัติให้เกิดขึ้นของ แนวคิดใหม่ กลยุทธ์ใหม่ การบริหารจัดการแบบใหม่ กระบวนการสื่อสารแบบใหม่ หรือ รูปแบบการดำเนินงานวิธีใหม่ ที่ส่งผลให้เกิดการพัฒนา ปรับปรุงผลลัพธ์ และผลการดำเนินงานขององค์กร ให้บรรลุผลสำเร็จ ผลกระทบจากนวัตกรรมในองค์กรภาครัฐอาจส่งผลให้เกิดการปรับปรุง คุณภาพการให้บริการ เพิ่มประสิทธิผลและประสิทธิภาพของกิจกรรมและนโยบายของรัฐ และเพิ่มคุณค่าทางสังคมและเศรษฐกิจ

ความเป็นนวัตกรรมขององค์กร (Organisational Innovativeness)

หมายถึง แนวโน้มโดยรวมขององค์กรที่จะพัฒนานวัตกรรมให้เกิดขึ้น และสมรรถภาพของ องค์กรที่จะริเริ่มและบริหารจัดการกิจกรรมและกระบวนการที่เกี่ยวข้องกับการพัฒนานวัตกรรม สร้างค่านิยมและวัฒนธรรมองค์กรที่จะทำให้การดำเนินงานขององค์กรดีขึ้น ทำให้องค์กร บรรลุผลสำเร็จ และเพิ่มความสามารถในการแข่งขัน

โดยทั่วไปองค์กรต้องมีนวัตกรรมเกิดขึ้นแล้วจึงจะได้ชื่อว่าเป็นองค์กรนวัตกรรม แต่การที่ นวัตกรรมจะเกิดขึ้นได้องค์กรนั้นต้องมีคุณลักษณะเฉพาะบางอย่างที่เหมาะสมเอื้อต่อการพัฒนา และส่งเสริมนวัตกรรม ดังนั้นในกรณีนี้องค์กรต้องมีคุณลักษณะความเป็นนวัตกรรมที่เกิดขึ้นมา ก่อน

และนำไปสู่การพัฒนา นวัตกรรม

คะแนน 1 = ปัจจัยนั้นไม่มีความสำคัญโดยสิ้นเชิง หรือไม่เกี่ยวข้องกับองค์กรของคุณ

คะแนน 2 = ปัจจัยนั้นไม่มีความสำคัญ

คะแนน 3 = ปัจจัยนั้นมีความสำคัญบ้างเล็กน้อย

คะแนน 4 = ปัจจัยนั้นมีความสำคัญ

คะแนน 5 = ปัจจัยนั้นมีความสำคัญอย่างมาก

| Factor | Rating | | | | |
|--|--------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| (F1): วัฒนธรรมเพื่อนวัตกรรม ได้แก่ ความคิดริเริ่มสร้างสรรค์ ความเปิดเผยยอมรับสิ่งใหม่การเปลี่ยนแปลงและความแตกต่าง องค์กรแห่งการเรียนรู้ การยอมรับและยอมรับความล้มเหลวเพื่อเรียนรู้จากสิ่งผิดพลาด ยกเลิกระบบราชการที่ไม่คล่องตัวเป็นการดำเนินงานที่กระฉับกระเฉงมีประสิทธิภาพ | | | | | |
| (F2): ผู้นำองค์กรมีแนวคิดบวกต่อนวัตกรรม ใส่ใจต่อพนักงาน สนับสนุนให้โอกาส ให้ความสำคัญและสื่อสารกับพนักงานทุกระดับ ผู้นำมีความสามารถชี้ทิศทาง นำพา ปฏิรูปและเปลี่ยนแปลงองค์กร ไปสู่ความสำเร็จ | | | | | |
| (F3): ยุทธศาสตร์องค์กร แผนงานพัฒนานวัตกรรม และระบบกลไกติดตามที่มีประสิทธิภาพ ช่วยให้องค์กรบรรลุผลสำเร็จและเป้าหมายสูงสุดที่ต้องการ รองรับและบรรเทาอุปสรรคหรือการเปลี่ยนแปลงทางลบที่อาจเกิดขึ้นระหว่างการดำเนินงาน | | | | | |
| (F4): พนักงานมีแรงจูงใจและมีความสามารถสูง รักการเรียนรู้ มีศักยภาพ สมรรถภาพ และสมรรถนะ ทำงานตามหน้าที่ได้ดี มีประสิทธิภาพ และมีส่วนร่วมช่วยส่งเสริมให้องค์กรบรรลุเป้าหมายและประสบความสำเร็จ | | | | | |
| (F5): ทรัพยากรและโครงสร้างพื้นฐานเพื่อนวัตกรรม มีงบประมาณและเงินทุนสนับสนุนเพียงพอ มีการทำวิจัยและพัฒนา มีเทคโนโลยีด้านคอมพิวเตอร์และเครือข่ายระบบสารสนเทศที่ทันสมัยและมีประสิทธิภาพรองรับการเป็นรัฐอิเล็กทรอนิกส์และสังคมดิจิทัล | | | | | |
| (F6): ทีมบริหารองค์กรที่มีแนวปฏิบัติและความสามารถส่งเสริมนวัตกรรม บริหารจัดการความรู้และพนักงานองค์กร นำไปสู่การปรับปรุงระบบการทำงาน กระบวนการขั้นตอนการดำเนินงาน ผลผลิต และผลลัพธ์ที่ดีขึ้น | | | | | |
| (F7): ระบบติดตามและประเมินผลการดำเนินงานที่มีประสิทธิภาพ เช่น การเปรียบเทียบผลผลิตและผลลัพธ์นวัตกรรมกับองค์กรอื่นๆ ที่คล้ายกันในประเทศและต่างประเทศ การบรรลุผลสำเร็จของเป้าหมายและตัวชี้วัดผลรายปี และการนำความคิดเห็นและข้อเสนอแนะของผู้มีส่วนได้เสียมาปรับปรุงการให้บริการและผลการดำเนินงานขององค์กร | | | | | |

| Factor | Rating | | | | |
|--|--------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| (F8): เครือข่ายความร่วมมือและปัจจัยภายนอกที่ส่งเสริมนวัตกรรม เช่น การสร้างความร่วมมือและใช้ประโยชน์จากเครือข่ายองค์กรนวัตกรรมอื่นๆ จากทุกภาคส่วนอย่างมีประสิทธิภาพ และการทำให้องค์กรได้รับประโยชน์เต็มที่จากนโยบายของรัฐ โครงการใหม่ กฎหมาย และข้อบังคับ ที่สนับสนุนส่งเสริมนวัตกรรม | | | | | |

ส่วนที่ 4: ข้อมูลองค์กร

Q9. องค์กรของคุณตั้งอยู่ในประเทศใด?

- ไทย
- อื่นๆ (โปรดระบุ) _____

Q10. องค์กรของคุณจัดอยู่ในภาคส่วนใด?

- ภาครัฐ
- ภาคการศึกษา
- ภาคเอกชน
- องค์กรนอกภาครัฐ (NGO)
- อื่นๆ (โปรดระบุ) _____

Q11. โปรดระบุชื่อองค์กรของคุณ

Q12. องค์กรของคุณมีภารกิจหลักและหน้าที่เกี่ยวข้องกับด้านใดต่อไปนี้? (เลือกตอบได้มากกว่า 1 ข้อ)

- วิทยาศาสตร์ เทคโนโลยี และนวัตกรรม (วทน.)
- เทคโนโลยีสารสนเทศและการสื่อสาร (ไอซีที)
- การปกครอง บริหาร และการบริการสาธารณะ
- การศึกษาและการเรียนการสอน
- วัฒนธรรม การท่องเที่ยว ประวัติศาสตร์ และศิลปะ
- กีฬาและการบันเทิง
- อุตสาหกรรม พาณิชยกรรม และการผลิตสินค้า

- พลังงาน
- การเกษตรและอาหาร
- การบริการสุขภาพ และเภสัชกรรม
- ทรัพยากรธรรมชาติและสิ่งแวดล้อม
- กฎหมาย ทหาร ความมั่นคงแห่งชาติ
- การเงิน การธนาคาร และเศรษฐกิจ
- การต่างประเทศ และการทูต
- องค์กรนอกภาครัฐ (NGO)
- อื่นๆ (โปรดระบุ) _____

Q13. ภารกิจและหน้าที่หลักขององค์กรของคุณ เกี่ยวข้องกับการพัฒนาและส่งเสริมวิทยาศาสตร์ เทคโนโลยี และนวัตกรรม (วทน.) หรือไม่?

- เกี่ยวข้อง ไม่เกี่ยวข้อง

Q14. องค์กรของคุณมีพนักงานจำนวนเท่าไร?

- 1 – 50 คน
- 51- 100 คน
- 101 – 200 คน
- 201 – 400 คน
- 401 –700 คน
- 701 –1000 คน
- 1,001 – 2000 คน
- มากกว่า 2000 คน



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Q15. องค์กรของคุณจัดเป็นหน่วยงานของรัฐหรือไม่?

ในแบบสอบถามนี้ หน่วยงานของคุณจัดว่าเป็นหน่วยงานของรัฐ หากหน่วยงานของคุณได้รับงบประมาณส่วนใหญ่มาจากงบประมาณกลางของรัฐ หรือจากองค์กรรัฐส่วนท้องถิ่น

- จัดเป็นหน่วยงานของรัฐ ไม่จัดเป็นหน่วยงานของรัฐ

ถ้าองค์กรของคุณจัดเป็นหน่วยงานของรัฐ โปรดไปที่ข้อ Q16 และทำแบบสอบถามทุกข้อต่อไป

ถ้าองค์กรของคุณไม่จัดเป็นหน่วยงานของรัฐ โปรดข้ามส่วนที่ 5: การวัดระดับความเป็นนวัตกรรมองค์กร และไปที่ข้อ Q20 ในส่วนที่ 6: ความคิดเห็นมวถนต่อคณะกรรมการอาเซียนด้านวิทยาศาสตร์และเทคโนโลยี (ASEAN COST) และคณะทำงานกลุ่มต่างๆ ที่เกี่ยวข้อง

ส่วนที่ 5: วัดระดับความเป็นนวัตกรรมองค์กรภาครัฐ

Q16. องค์กรของคุณจัดอยู่ในระดับใด?

- กระทรวงระดับชาติ หรือเทียบเท่า
- หน่วยงานหนึ่งในกระทรวง หรือเทียบเท่า
- ฝ่ายหนึ่งในหน่วยงานหนึ่งของกระทรวง หรือเทียบเท่า
- อื่นๆ (โปรดระบุ) _____

Q17. องค์กรของคุณจัดอยู่ในประเภทใด?

- องค์กรระหว่างประเทศของรัฐ (เช่น สำนักเลขาธิการอาเซียน)
- ส่วนราชการ (เช่น สำนักงานปลัดในกระทรวง)
- รัฐวิสาหกิจ
- องค์กรมหาชนของรัฐ
- องค์กรของรัฐที่เป็นอิสระ
- อื่นๆ (โปรดระบุ) _____

Q18. อะไรเป็นเหตุผลหรือแรงจูงใจให้คุณเลือกทำงานในองค์กรของรัฐ (เลือกตอบได้มากกว่า 1 ข้อ)

- ความมั่นคงในหน้าที่การงาน
- เพื่ออุทิศตนทำงานเพื่อสังคมส่วนรวม
- ผลตอบแทนด้านการเงินสูง
- ความก้าวหน้าในตำแหน่งหน้าที่
- การประกันและผลประโยชน์ด้านการรักษาสุขภาพ
- โอกาสการอบรมความรู้และการศึกษาต่อ
- ใช้ทุนการศึกษาหรือสัญญาผูกพัน
- อื่นๆ (โปรดระบุ) _____

Q19. โปรดกาเครื่องหมาย ✓ หน้าข้อคะแนนระดับ 1-5 ในตัวเลือกความคิดเห็นต่อคำกล่าวเกี่ยวกับการวัดระดับความเป็นนวัตกรรมขององค์กรของคุณ

ระดับ 1 = ไม่เห็นด้วยอย่างยิ่งกับคำกล่าวนั้น หรือคำกล่าวนั้นไม่เกี่ยวข้องกับองค์กรของคุณ

ระดับ 2 = ไม่เห็นด้วยกับคำกล่าวนั้น

ระดับ 3 = เห็นด้วยเล็กน้อยกับคำกล่าวนั้น

ระดับ 4 = เห็นด้วยกับคำกล่าวนั้น

ระดับ 5 = เห็นด้วยอย่างยิ่งกับคำกล่าวนั้น

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|---|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT01 | องค์กรของฉันสนับสนุนและกระตุ้นให้พนักงานค้นหาแนวคิดใหม่และหาทางออกใหม่ที่ดีกว่าด้วยตนเองในการแก้ไขปัญหาต่างๆ ที่เกิดขึ้นในที่ทำงานเสมอ | | | | | |
| IT02 | องค์กรของฉันพยายามคิดค้นสร้างสรรค์ และพัฒนา นวัตกรรมอย่างต่อเนื่องเพื่อผลิตผลใหม่ที่ดีกว่า และการบริการประชาชนที่ดีขึ้น | | | | | |
| IT03 | องค์กรของฉันยอมรับได้กับพนักงานที่มีวิธีการทำงานที่แตกต่างจากที่เคยทำกันมาก่อน | | | | | |
| IT04 | พนักงานในองค์กรของฉันสามารถทำทายอย่างสมเหตุสมผล แนวคิดรูปแบบการดำเนินงานแบบเดิมๆ ที่เคยทำกันมาโดยไม่ถูกเพ่งเล็งหรือเพ่งโทษ | | | | | |
| IT05 | องค์กรของฉันกระตุ้นให้พนักงานติดต่อสื่อสารระหว่างต่างฝ่ายต่างแผนกในทุกระดับชั้นบังคับบัญชา เพื่อแลกเปลี่ยนแนวคิด ความเห็น วิธีการดำเนินงานที่บรรลุผลดีที่สุด และเรียนรู้จากข้อผิดพลาด เพื่อพัฒนาให้องค์กรดีขึ้น | | | | | |
| IT06 | องค์กรของฉันสนับสนุนให้พนักงานทดลองเสี่ยงใช้วิธีการทำงานแบบใหม่เพื่อเรียนรู้จากความล้มเหลว ด้วยความเข้าใจว่าบางเรื่องอาจไม่ประสบความสำเร็จเสมอไป | | | | | |
| IT07 | องค์กรของฉันมีระบบสนับสนุน สิ่งจูงใจ และรางวัลให้พนักงานทดลองเสี่ยงอย่างสมเหตุสมผล เพื่อให้ประสบความสำเร็จในหน้าที่ที่รับผิดชอบ | | | | | |
| IT08 | องค์กรของฉันปรับเปลี่ยนรูปแบบการบริหารและกระบวนการดำเนินงานภายในองค์กรให้กระชับมีความคล่อง | | | | | |

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|--|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | ตัวอย่างต่อเนื่อง เพื่อผลการดำเนินงานที่มีประสิทธิภาพ และลดพิธีรีตองหรือวิธีการแบบเดิม | | | | | |
| IT09 | องค์กรของฉันทันสามารถเรียกได้ว่ามีความคล่องตัวและสามารถปรับเปลี่ยนรองรับความเปลี่ยนแปลงและความท้าทายต่างๆ อย่างต่อเนื่องได้ตลอดเวลา | | | | | |
| IT10 | ผู้นำระดับสูงในองค์กรของฉันทันเอาใส่ใจพนักงานรายบุคคล ส่งเสริมให้กำลังใจ และสนับสนุนให้พนักงานพัฒนาเพื่อความก้าวหน้า | | | | | |
| IT11 | ผู้นำระดับสูงในองค์กรของฉันทันให้ความเห็นและคำแนะนำอย่างตรงไปตรงมาในฐานะผู้เชี่ยวชาญต่อรัฐมนตรี ตามหลักฐานสนับสนุนจากผลการวิจัยและตัวชี้วัดที่เกี่ยวข้อง | | | | | |
| IT12 | ผู้นำระดับสูงในองค์กรของฉันทันแจ้งให้พนักงานทราบและมีส่วนร่วมในกระบวนการตัดสินใจในเรื่องที่สำคัญขององค์กร | | | | | |
| IT13 | ผู้นำระดับสูงในองค์กรของฉันทันปฏิบัติตนเป็นตัวอย่างการเปลี่ยนแปลงองค์กรในทางที่ดีขึ้น และพยายามกำจัดอุปสรรคเพื่อทำให้องค์กรบรรลุผลสำเร็จ | | | | | |
| IT14 | ผู้นำระดับสูงในองค์กรของฉันทันให้โอกาส เครื่องมือ และสิ่งแวดลอมที่เหมาะสม เพื่อสนับสนุนพนักงานให้พัฒนานวัตกรรม และสามารถประสบความสำเร็จในตำแหน่งหน้าที่ | | | | | |
| IT15 | ผู้นำระดับสูงในองค์กรของฉันทันมุ่งมั่นบริหารองค์กรด้วยความซื่อสัตย์เพื่อให้บริการประชาชน และสร้างผลกระทบคุณค่าด้านบวกต่อสังคม | | | | | |
| IT16 | โอกาส ปัญหา และสิ่งท้าทายใหม่ๆ ของสังคมได้ถูกระบุอย่างตรงจุดและนำเข้าไปเป็นส่วนหนึ่งของนโยบาย ยุทธศาสตร์ และโครงการต่างๆ ขององค์กรอย่างมีประสิทธิภาพ | | | | | |
| IT17 | การพัฒนาและการส่งเสริมนวัตกรรมเป็นส่วนหนึ่งของพันธกิจ ยุทธศาสตร์ และภารกิจขององค์กรของฉันทัน | | | | | |
| IT18 | เป้าหมายยุทธศาสตร์ ภารกิจ และนโยบายขององค์กรของฉันทันได้ถูกอธิบายแจกแจงอย่างละเอียดเพื่อให้พนักงานทุกคนในองค์กรเข้าถึง เข้าใจ และปฏิบัติตาม | | | | | |

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|--|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT19 | ผู้นำระดับสูงในองค์กรของฉันมุ่งมั่นพัฒนาเป้าหมายความสำเร็จขององค์กรในระยะยาวอย่างแน่ชัด มากกว่าเป้าหมายระยะสั้นที่สำคัญน้อยกว่า | | | | | |
| IT20 | เป้าหมายการทำงานของพนักงานในองค์กรของฉันได้ถูกระบุอย่างชัดเจนด้วยเกณฑ์ที่วัดผลได้จริง และเชื่อมโยงสู่เป้าหมายวัตถุประสงค์และตัวชี้วัดผลสำเร็จขององค์กร | | | | | |
| IT21 | องค์กรของฉันมีระบบติดตามแผนยุทธศาสตร์และวิธีการดำเนินงานที่มีประสิทธิภาพ เพื่อเตรียมการรองรับการเปลี่ยนแปลงอย่างไม่คาดคิดจากการปรับเปลี่ยนนโยบายรัฐบาล โครงการเร่งด่วน และภารกิจที่ได้รับมอบหมาย | | | | | |
| IT22 | พนักงานในองค์กรของฉันเต็มใจที่จะพยายามทำงานหนักเกินกว่าที่จำเป็น เพื่อให้องค์กรประสบความสำเร็จและสามารถแข่งขันได้ | | | | | |
| IT23 | พนักงานในองค์กรของฉันเชื่อว่าภารกิจหนักที่ทำงานที่บรรลุผลสำเร็จได้ถูกยอมรับ ถูกเห็นในคุณค่า และได้รับการตอบแทนอย่างเป็นธรรมเหมาะสม | | | | | |
| IT24 | พนักงานในองค์กรของฉันได้รับกำลังใจและมีความกระตือรือร้นด้วยตนเองอยู่เสมอ ที่จะมอบการบริการที่ดีกว่า และผลลัพธ์ที่ดีกว่าสู่ประชาชน | | | | | |
| IT25 | พนักงานในองค์กรของฉันเป็นผู้มีทักษะความรู้ความสามารถสูง และมีความเชี่ยวชาญเหมาะสมกับตำแหน่งหน้าที่และภารกิจที่ได้รับมอบหมาย | | | | | |
| IT26 | พนักงานในองค์กรของฉันมักได้รับโอกาสให้เข้าร่วมในกิจกรรมและการศึกษาเรียนรู้เพิ่มเติมที่เหมาะสมกับความต้องการและความสนใจส่วนบุคคล เพื่อพัฒนาทักษะความรู้ความสามารถ | | | | | |
| IT27 | พนักงานในองค์กรของฉันถูกยอมรับโดยทั่วไปว่าเป็นบุคลากรผู้มีความสามารถสูงและสามารถดำเนินงานได้อย่างดี มีประสิทธิภาพ เทียบจากองค์กรอื่นๆ ที่มีภารกิจหน้าที่คล้ายกัน | | | | | |
| IT28 | องค์กรของฉันมีงบประมาณเพียงพอที่ถูกจัดสรร โดยเฉพาะเพื่อการพัฒนาและปรับปรุงอย่างต่อเนื่องของ กิจกรรมใหม่ | | | | | |

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|--|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | โครงการใหม่ ผลผลิตใหม่ หรือการบริการใหม่ที่ดีกว่าเดิม ออกสู่สาธารณชน | | | | | |
| IT29 | องค์กรของฉันทันมีงบประมาณเพียงพอที่ถูกจัดสรร โดยเฉพาะ เพื่อการพัฒนาและปรับปรุงอย่างต่อเนื่องของ ระบบการ บริหารงานภายใน วิธีปฏิบัติ และการดำเนินงานขององค์กร ให้มีคุณภาพและประสิทธิภาพดีขึ้น | | | | | |
| IT30 | องค์กรของฉันทันลงทุนในหน่วยวิจัยและพัฒนาในองค์กร ที่ สามารถคิดค้นผลผลิตและผลลัพธ์ที่ดีขึ้น ได้อย่างมี ประสิทธิผลและประสิทธิภาพ | | | | | |
| IT31 | องค์กรของฉันทันจ้างหรือร่วมมือกับผู้เชี่ยวชาญภายนอกเพื่อ กิจกรรมวิจัยและพัฒนาโครงการใหม่ ผลผลิตผลิตหรือการ บริการใหม่ที่ดีกว่าสู่สาธารณชน | | | | | |
| IT32 | องค์กรของฉันทันมีระบบเครือข่ายคอมพิวเตอร์และอินเทอร์เน็ต ที่มั่นคงปลอดภัย มีประสิทธิภาพ รวดเร็ว และระบบเชื่อมต่อ อินเทอร์เน็ตไร้สายที่มีคุณภาพสูง สำหรับให้พนักงานทุกคน ใช้และเชื่อมต่อได้ตลอดเวลา | | | | | |
| IT33 | องค์กรของฉันทันมีระบบบริการให้คำปรึกษาและให้ความ ช่วยเหลือที่รวดเร็วมีคุณภาพและวางใจได้ เมื่อพนักงาน ประสบปัญหาเกี่ยวกับการใช้คอมพิวเตอร์และเทคโนโลยี สารสนเทศ | | | | | |
| IT34 | องค์กรของฉันทันมีเว็บไซต์ทางการทั้งภาษาไทยและ ภาษาอังกฤษที่ได้รับการดูแลปรับปรุงข้อมูลข่าวสารให้ ทันสมัยเสมอ มีรายละเอียดเกี่ยวกับผลิตภัณฑ์และบริการ ล่าสุด เผยแพร่สิ่งพิมพ์ให้ความรู้ โครงสร้างบริหารองค์กร และรายละเอียดให้สาธารณชนติดต่อได้ทั้งภายในและ ต่างประเทศ | | | | | |
| IT35 | องค์กรของฉันทันใช้ประโยชน์จากเทคโนโลยีสารสนเทศ สื่อ สังคมออนไลน์ และแอปพลิเคชันของโทรศัพท์มือถือ เพื่อ ติดต่อสื่อสารภายในองค์กรและเข้าถึงสาธารณชนมากขึ้น | | | | | |
| IT36 | องค์กรของฉันทันมีคู่มือ ฐานข้อมูล และข้อมูลการดำเนินงานใน องค์กร ที่ช่วยให้องค์ความรู้จากอดีตไม่สูญหาย และสามารถ นำมาปรับใช้ในปัจจุบัน แม้พนักงานจะเปลี่ยนไป | | | | | |

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|---|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT37 | ฝ่ายบริหารองค์กรของฉันทส่งเสริมความร่วมมือการทำงานเป็นทีมจากต่างฝ่ายต่างแผนกเพื่อแลกเปลี่ยนความรู้และประสบการณ์ ช่วยให้องค์กรบรรลุผลผลิตและผลลัพธ์ที่ดีที่สุด | | | | | |
| IT38 | พนักงานในองค์กรของฉันทได้รับพิจารณาขั้นตำแหน่งหน้าที่เหมาะสมกับภาระความรับผิดชอบ ความสามารถ และความรู้ความเชี่ยวชาญ | | | | | |
| IT39 | โครงสร้างบริหารขององค์กรของฉันทมีขนาดและลำดับชั้นบังคับบัญชาเหมาะสมกับการบริหารองค์กรให้มีประสิทธิภาพ สามารถตอบสนองได้อย่างรวดเร็วต่อการปรับเปลี่ยนแผนงาน ยุทธศาสตร์ และการดำเนินงานต่างๆ | | | | | |
| IT40 | ฝ่ายบริหารองค์กรและฝ่ายบุคคลขององค์กรของฉันทสามารถสร้าง พัฒนาส่งเสริม และจูงใจพนักงานผู้มีความรู้ความสามารถสูงและมีผลงานดีให้ทำงานอยู่กับองค์กรต่อไปได้ | | | | | |
| IT41 | ฝ่ายบริหารองค์กรของฉันทสามารถช่วยให้ข้อมูลเชิงลึก แสดงความคิดเห็น และให้ข้อเสนอแนะที่เป็นประโยชน์เสมอ ซึ่งช่วยบ่งชี้โอกาสที่เป็นไปได้และจัดอุปสรรคในการทำงาน | | | | | |
| IT42 | ฝ่ายบริหารองค์กรของฉันททำให้มั่นใจว่าระบบการทำงานใหม่และสิ่งที่ได้รับการปรับปรุงให้ดีขึ้นซึ่งอาจเป็นประโยชน์ต่อองค์กรโดยรวม จะถูกนำมาหารือและแบ่งปันข้อมูลให้พนักงานทุกคนได้รับทราบ | | | | | |
| IT43 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทสามารถผลิตนวัตกรรมได้เป็นที่น่าพอใจ เช่น ผลิตภัณฑ์ใหม่ บริการใหม่ที่ดีกว่า สิทธิบัตร ลิขสิทธิ์ โครงการ กิจกรรม และนโยบายที่ตอบสนองความต้องการของประชาชน | | | | | |
| IT44 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทจัดพิมพ์เผยแพร่งานวิจัยในวารสารที่อ้างอิงได้ทั้งภายในและต่างประเทศ รวมทั้งเผยแพร่สิ่งตีพิมพ์ เช่น รายงานทางการ เอกสาร จดหมายข่าวที่ให้สาระความรู้และสร้างความตระหนักแก่ประชาชน | | | | | |
| IT45 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทสามารถดำเนินงานให้เป้าหมายรายปีและตัวชี้วัดต่างๆ ที่ตั้งไว้บรรลุผลสำเร็จ | | | | | |

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|---|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT46 | ตลอดสามปีที่ผ่านมาเมื่อเปรียบเทียบกับองค์กรที่มีภารกิจหน้าที่คล้ายกันในประเทศ องค์กรของฉันทันบรรลุผลสำเร็จมากกว่าองค์กรอื่นๆ | | | | | |
| IT47 | ตลอดสามปีที่ผ่านมาเมื่อเปรียบเทียบกับองค์กรที่มีภารกิจหน้าที่คล้ายกันต่างประเทศทั่วโลก องค์กรของฉันทันบรรลุผลสำเร็จมากกว่าองค์กรอื่นๆ | | | | | |
| IT48 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทันเปรียบเทียบผลผลิตกับเกณฑ์มาตรฐานคุณภาพและเผยแพร่ประชาสัมพันธ์ผลการดำเนินงานกับผู้มีส่วนได้ส่วนเสียภายนอกองค์กรด้วยรายงานประจำปี การประชุมกับกลุ่มผู้มีส่วนได้ส่วนเสีย การชี้แจงผ่านสื่อออนไลน์ และการประชุมสัมมนาเครือข่ายกับตัวแทนภาคส่วนต่างๆ | | | | | |
| IT49 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทันปรับปรุงระบบการบริหารงานและขั้นตอนการดำเนินงานภายใน ทำให้องค์กรมีคุณภาพ ประสิทธิภาพ และผลการดำเนินงานดีขึ้น | | | | | |
| IT50 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทันจัดทำแบบสอบถามความคิดเห็นจากผู้มีส่วนได้ส่วนเสียและผู้รับบริการเป็นระยะ และนำข้อเสนอแนะที่ได้รับมาปรับปรุงการบริหารงาน วิธีการดำเนินงาน และผลการดำเนินงานให้ดีขึ้น | | | | | |
| IT51 | องค์กรของฉันทันมีระบบการติดตามและประเมินผลการดำเนินงานที่มีคุณภาพและประสิทธิภาพ เช่น บาลานซ์ สกอร์การ์ด แดชบอร์ดการจัดการ ระบบติดตามตัวชี้วัดผลการดำเนินงาน ที่พนักงานทุกคนนำมาใช้ประโยชน์ได้จริง เพื่อติดตามผลและทำให้มั่นใจว่าภารกิจและวิสัยทัศน์แห่งความสำเร็จได้ถูกเปลี่ยนเป็นกิจกรรมและการบริหารงานตามจริง | | | | | |
| IT52 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทันใช้ประโยชน์จากหน่วยตรวจสอบภายในที่เป็นอิสระและเป็นกลางอย่างมีประสิทธิภาพและประสิทธิภาพ ในการติดตาม ประเมิน และให้คำแนะนำเพื่อทำให้การปฏิบัติงานประจำวันและผลการดำเนินงานของทุกหน่วยในองค์กรดีขึ้น | | | | | |

| ข้อ | คำกล่าววัดระดับความเป็นนวัตกรรมองค์กร | ระดับคะแนน 1-5 | | | | |
|------|---|----------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT53 | ตลอดสามปีที่ผ่านมาองค์กรของฉันทสามารถปฏิบัติตามคำแนะนำของหน่วยตรวจสอบภายนอก และ/หรือ กลุ่มผู้เชี่ยวชาญ ที่เป็นอิสระและเป็นกลาง ได้อย่างสัมฤทธิ์ผล ในการประเมินผลการดำเนินงานและความสำเร็จตามเป้าหมาย และตัวชี้วัดขององค์กร | | | | | |
| IT54 | องค์กรของฉันทจัดตั้ง รักษา และใช้ประโยชน์อย่างมีประสิทธิภาพผลจาก เครือข่ายความร่วมมือในประเทศ และความ ร่วมมือด้านการวิจัยและพัฒนา กับหน่วยงานที่มีความเป็น นวัตกรรมอื่นๆ | | | | | |
| IT55 | องค์กรของฉันทจัดตั้ง รักษา และใช้ประโยชน์อย่างมีประสิทธิภาพผลจาก เครือข่ายความร่วมมือต่างประเทศ และความ ร่วมมือด้านการวิจัยและพัฒนา กับหน่วยงานที่มีความเป็น นวัตกรรมอื่นๆ | | | | | |
| IT56 | องค์กรของฉันทร่วมมือและได้รับประโยชน์จากหุ้นส่วนความ ร่วมมือกับต่างภาคส่วน ได้แก่ องค์กรของรัฐอื่นๆ บริษัทเอกชน มหาวิทยาลัย และองค์กรนอกภาครัฐ | | | | | |
| IT57 | องค์กรของฉันทได้รับประโยชน์อย่างเต็มที่จากนโยบายและ กฎหมายข้อบังคับของรัฐบาลกลาง และ/หรือ รัฐบาลส่วน ท้องถิ่น ในการพัฒนาส่งเสริมนวัตกรรมและกิจกรรมที่ เกี่ยวข้องกับนวัตกรรม กิจกรรมที่เกี่ยวข้องกับนวัตกรรม ได้แก่ การลงทุนในการวิจัย และพัฒนา การซื้อเทคโนโลยีและองค์ความรู้ ความร่วมมือ กับต่างภาคส่วน และการจัดตั้งองค์กรลูกสปีนออฟ และ องค์กรใหม่สปีนเออท์) | | | | | |
| IT58 | องค์กรของฉันทได้รับการสนับสนุนจากรัฐบาลกลาง รัฐบาล ส่วนท้องถิ่น และ/หรือ บริษัทเอกชน ในการลงทุนด้าน นวัตกรรมและกิจกรรมที่เกี่ยวข้องกับนวัตกรรม | | | | | |
| IT59 | นโยบายรัฐบาล กฎหมาย ข้อบังคับ การกิจและบรรยากาศ ทางการเมืองช่วยสนับสนุนนวัตกรรมและกิจกรรมที่เกี่ยวข้อง กับนวัตกรรมในองค์กรของฉันท | | | | | |

ส่วนที่ 6: ความคิดเห็นต่อ ASEAN COST และเครือข่ายที่เกี่ยวข้อง กรุณาใส่เครื่องหมาย ✓ ในช่องที่เลือก

Q20. คุณเคยรู้จัก เข้าร่วมการประชุม หรือร่วมมือกับคณะกรรมการอาเซียนด้านวิทยาศาสตร์และเทคโนโลยี (ASEAN Committee on Science and Technology – COST) และการประชุมรัฐมนตรีอาเซียนด้านวิทยาศาสตร์และเทคโนโลยี (ASEAN Ministerial Meeting on Science and Technology – AMMST) หรือไม่?

- เคย ไม่เคย

Q21. คุณเคยรู้จัก เข้าร่วมการประชุม หรือร่วมมือกับเครือข่ายกลุ่มต่างๆ ภายใต้ ASEAN COST เหล่านี้หรือไม่ (เลือกตอบได้มากกว่าหนึ่งข้อ)

- BAC (Boards of Advisors to COST)
- ABAPAST (Advisory Body of the ASEAN Plan of Action on Science and Technology)
- ABASF (Advisory Body of the ASEAN Science Fund)
- Krabi Initiative
- APASTI 2016-2025 (ASEAN Plan of Action on Science, Technology and Innovation)
- SCB (Sub-Committee on Biotechnology)
- SCFST (Sub-Committee on Food Science and Technology)
- SCIRD (Sub-Committee on S&T Infrastructure and Resources Development)
- SCMG (Sub-Committee on Meteorology and Geophysics)
- SCMIT (Sub-Committee on Microelectronics and Information Technology)
- SCMSAT (Sub-Committee on Marine Science and Technology)
- SCMST (Sub-Committee on Material Science and Technology)
- SCSER (Sub-Committee on Sustainable Energy Research)
- SCOSA (Sub-Committee on Space Technology and Applications)
- อื่นๆ (โปรดระบุ) _____
- ไม่ ฉันไม่เคยรู้จัก ไม่เคยเข้าร่วม หรือไม่เคยร่วมมือกับ ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง

Q22. คุณเคยรู้จัก เข้าร่วมการประชุม หรือร่วมมือกับหน่วยงานจากประเทศคู่เจรจาที่เกี่ยวข้องกับ ASEAN COST เหล่านี้หรือไม่ (เลือกตอบได้มากกว่าหนึ่งข้อ)

- ASEAN-China JSTC (Joint Science and Technology Committee)
- ASEAN-EU DST (Dialogue on Science and Technology)
- ASEAN-India WGST (Working Group on Science and Technology)
- ASEAN-Japan CCST (Cooperation Committee on Science and Technology)
- ASEAN-ROK JSTC (Joint Science and Technology Committee)

- ASEAN-Russia WGST (Working Group on Science and Technology)
- ASEAN-US CST (Consultation on Science and Technology)
- ASEAN COST+3 (ASEAN COST Plus China, Japan and ROK)
- อื่นๆ (โปรดระบุ) _____
- ไม่ ฉันไม่เคยรู้จัก ไม่เคยเข้าร่วม หรือไม่เคยร่วมมือกับหน่วยงานจากประเทศผู้เจรจาที่เกี่ยวข้องกับ ASEAN COST

Q23. คุณเคยรู้จัก เข้าร่วมการประชุม หรือร่วมมือกับเครือข่ายหรือศูนย์อาเซียนต่างๆ ที่เกี่ยวข้องกับ ASEAN COST เหล่านี้หรือไม่ (เลือกตอบได้มากกว่าหนึ่งข้อ)

- TTF-TW (Technical Task Force on Tsunami Warning under SCMG)
- TWG-NPP (Technical Working Group on Nuclear Power Plant under SC SER)
- EGM (Experts Group on Metrology under SCIRD)
- ASEAN Large Nuclear and Synchrotron Network
- ASEAN Network for Nuclear Power Safety Research
- ASEAN Network on Microbial Utilization (AnMicro)
- ASEAN Network for Drugs, Diagnostics and Vaccines Innovation (ASEAN-NDI)
- ASEAN Hydroinformatics and Climate Data Center (AHC)
- ASEAN Research and Training Centre for Space Technology and Applications (ARTSA)
- ASEAN Specialised Meteorology Centre (ASMC)
- ASEAN Earthquake Information Centre (AEIC)
- ASEAN Journal for S&T Development (AJSTD)
- ASEAN Science Technology and Innovation Week (ASTIW)
- ASEAN Food Conference
- ASEAN Climate Outlook Forum (ASEANCOF)
- อื่นๆ (โปรดระบุ) _____
- ไม่ ฉันไม่เคยรู้จัก ไม่เคยเข้าร่วม หรือไม่เคยร่วมมือกับเครือข่ายหรือศูนย์อาเซียนต่างๆ ที่เกี่ยวข้องกับ ASEAN COST

Q24. ถ้าคุณเคยรู้จัก ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง คุณรู้จักได้อย่างไร (เลือกตอบได้มากกว่าหนึ่งข้อ)

- ฉันเคยเข้าร่วมการประชุม ASEAN COST, AMMST, คณะอนุกรรมการ หรือกลุ่มต่างๆ ที่เกี่ยวข้อง
- ฉันเคยเป็นผู้แทนอย่างน้อยหนึ่งครั้งในกลุ่มที่เกี่ยวข้องกับ ASEAN COST
- ฉันเคยทำงานหรือร่วมมือกับ ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง

- องค์กรของฉันเคยร่วมมือกับ ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง
- องค์กรของฉันเคยได้รับเงินงบประมาณสนับสนุนจาก ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง
- องค์กรของฉันเคยให้เงินงบประมาณสนับสนุน ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง
- ฉันเคยได้ยิน ASEAN COST และกลุ่มต่างๆ ที่เกี่ยวข้องจากคนรู้จักหรือเพื่อนร่วมงาน
- ฉันเคยได้ยิน ASEAN COST การประชุม AMMST และกลุ่มต่างๆ ที่เกี่ยวข้องจากข่าวทางโทรทัศน์ วิทยุ หนังสือพิมพ์ อินเทอร์เน็ต และสื่อสังคมออนไลน์
- อื่นๆ (โปรดระบุ) _____
- ไม่ ฉันไม่เคยรู้จัก ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง

Q25. ถ้าคุณเคยเข้าร่วมการประชุมหรือเคยร่วมมือกับ ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง คุณมีความพึงพอใจกับผลการดำเนินงานและผลลัพธ์ของความร่วมมือครั้งล่าสุดนั้นอย่างไร

- ผลการดำเนินงานและผลลัพธ์ของความร่วมมือไม่เป็นที่น่าพอใจ
- ผลการดำเนินงานและผลลัพธ์ของความร่วมมือเป็นที่น่าพอใจบ้างพอควร
- ผลการดำเนินงานและผลลัพธ์ของความร่วมมือเป็นที่น่าพอใจอย่างมาก
- ไม่ทราบ เพราะไม่เคยร่วมมือกับ ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้องเลย

Q26. ถ้าคุณเคยร่วมมือกับ ASEAN COST หรือกลุ่มต่างๆ ที่เกี่ยวข้อง โปรดระบุชื่อกลุ่มหรือชื่อโครงการที่คุณให้ความเห็นในความพึงพอใจด้านผลการดำเนินงานและผลลัพธ์ของความร่วมมือ

APPENDIX 6C

Soal Selidik untuk Tinjauan Inovasi Organisasi dalam Agensi Awam

Bahagian 1: Pengenalan

Tujuan kaji selidik ini adalah untuk menilai inovasi organisasi dalam agensi-agensi awam atau kerajaan. Tinjauan ini adalah sebahagian daripada penyelidikan di *Technopreneurship and Innovation Management Programme*, Sekolah Pengajian Siswazah, Universiti Chulalongkorn, Bangkok, Thailand. Sebahagian daripada kaji selidik juga berkenaan dengan persepsi awam terhadap Jawatankuasa Sains dan Teknologi ASEAN (ASEAN COST) dan kumpulan-kumpulan yang berkaitan dengannya.

Kaji selidik ini akan mengambil masa kira-kira 15-20 minit.

Kaji selidik ini tidak memerlukan butir-butiran peribadi terperinci mengenai anda atau organisasi anda. Input dan jawapan anda tidak boleh dan tidak akan dikesan kembali kepada anda. Tujuan utama kaji selidik ini ialah untuk membandingkan inovasi organisasi dalam agensi-agensi awam atau kerajaan dari pelbagai negara di peringkat kebangsaan dan serantau.

Untuk setiap tinjauan yang telah selesai, penyelidik berjanji untuk menderma 20 Bhat Thailand atau kira-kira USD0.60 untuk menyokong aktiviti pendidikan dan pembelajaran kanak-kanak miskin di bandar di Thailand dan Malaysia. Sila bantu melengkapkan kaji selidik ini dan turut serta dalam amal muhibah. Terima kasih kerana melengkapkan kaji selidik ini. Sumbangan anda adalah amat dihargai.

Pautan *online* ialah: <https://www.surveymonkey.com/r/XFDKLSF>

Sekiranya anda mempunyai pertanyaan lanjut, sila hubungi penyelidik di APOINTsurvey@gmail.com.

Bahagian 2: Maklumat Peserta Kaji Selidik

S1. Apakah jantina anda?

- Lelaki Perempuan Lain-lain

S2. Berapa umur anda?

- Di bawah 25 tahun
 25-35 tahun
 36-45 tahun
 46-55 tahun
 56-65 tahun
 Lebih daripada 65 tahun

S3. Apakah tahap kedudukan pekerjaan anda sekarang?

- Pengarah eksekutif, timbalan pengarah, atau setaraf
 Pengurusan pertengahan
 Pekerja senior
 Pekerja junior
 Pelajar / Dalam latihan
 Pemilik perniagaan berkerja sendiri
 Penganggur
 Pesara

S4. Berapa lamakah anda berada dalam kedudukan semasa anda?

- Kurang daripada 1 tahun
 1-3 tahun
 4-6 tahun
 Lebih daripada 6 tahun

S5. Berapa lamakah anda telah bersama organisasi anda?

- Kurang daripada 1 tahun
 1-5 tahun

- 6-10 tahun
- 11-20 tahun
- Lebih daripada 20 tahun

S6. Apakah tahap pendidikan tertinggi anda?

- Doktor Falsafah
- Ijazah Sarjana
- Ijazah Sarjana Muda
- Di bawah ijazah sarjana muda

S7. Apakah bidang kepakaran dan kelayakan rasmi anda? (Lebih daripada satu jawapan boleh dipilih)

- Sains, teknologi, kejuruteraan, dan matematik (STEM)
- Penjagaan kesihatan dan perubatan
- Industri, perdagangan dan perkilangan
- Pendidikan dan pengajaran
- Ekonomi, kewangan, and akaun
- Pengurusan dan pentadbiran perniagaan
- Politik and dasar awam
- Undang-undang dan penguatkuasaan keselamatan
- Kajian sosial (termasuk seni, budaya, sejarah, sukan, media, dan hiburan)
- Lain-lain (sila nyatakan) _____

Bahagian 3: Faktor-faktor yang menyumbang kepada organisasi awam inovatif

Definisi-definisi inovasi dalam organisasi awam dan inovasi organisasi

***Inovasi dalam organisasi awam** ialah pengenalan, pengangkatan, and pelaksanaan idea, strategi, amalan pengurusan, proses komunikasi atau kaedah operasi baru, yang menghasilkan pembangunan baru, output, hasil dan prestasi yang lebih baik dalam sebuah organisasi. Kesan inovasi sebegini boleh menghasilkan penyampaian perkhidmatan lebih berkualiti, meningkatkan kecekapan, keberkesanan dasar, dan nilai kepada masyarakat.*

***Inovasi organisasi** ialah kecenderungan keseluruhan organisasi untuk menginovasi dan keupayaan organisasi tersebut untuk mengenalkan dan mengurus aktiviti, proses, amalan, dan budaya inovasi yang memperbaiki operasi, prestasi dan daya saing.*

Secara umum, inovasi mesti berlaku dalam sebuah organisasi untuk dianggap sebagai inovatif. Walau bagaimanapun, untuk berlakunya inovasi, sebuah organisasi mesti mempunyai ciri-ciri yang sesuai untuk inovasi.

S8. Betapa pentingnya faktor-faktor berikut dalam menyumbang kepada organisasi awam/kerajaan inovatif? Tarafkan setiap faktor pada skala 1-5 dengan menandakan X dimana:

1 = sama sekali tidak penting

2 = tidak penting

3 = sedikit penting

4 = penting

5 = sangat penting

| Faktor | Penarafan | | | | |
|--|-----------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| (F1) Budaya inovatif yang merangkumi kreativiti, keterbukaan, organisasi pembelajaran, pengambilan risiko dan toleransi terhadap kegagalan, tidak birokratik dan amalan perniagaan cekap. | | | | | |
| (F2) Sikap positif ketua organisasi terhadap inovasi , perhatian, sokongan, komunikasi kepada tenaga pekerja, dan kebolehan mengarah dan mengubah organisasi ke arah kejayaan. | | | | | |
| (F3) Pelan strategik dan pemulaan memupuk inovasi dan mekanisme susulan untuk mencapai tujuan penghujung organisasi dan mengurangkan perubahan negatif. | | | | | |

| | | | | | |
|--|--|--|--|--|--|
| (F4) Tenaga kerja yang bermotivasi dan berbakat yang bersedia belajar, dengan keupayaan dan kecekapan untuk melaksanakan kerja dengan cekap, dan menyumbang kepada sasaran dan pencapaian organisasi secara berkesan. | | | | | |
| (F5) Sumber dan infrastruktur yang mencukupi untuk inovasi termasuk bajet, dana, pelaburan dalam penyelidikan dan pembangunan, penggunaan ICT dan platform sosial yang ada dengan sepenuhnya, dan kesediaan terhadap e-kerajaan dan ekonomi digital. | | | | | |
| (F6) Amalan pengurusan dan keupayaan memupuk inovasi termasuk pengurusan pengetahuan dan tenaga kerja yang membawa kepada operasi, proses kerja dan hasil yang bertambah baik. | | | | | |
| (F7) Pengurusan prestasi dan sistem pemantauan yang inovatif termasuk menanda araskan output dan hasil inovatif dengan organisasi sejawat lain secara nasional dan global, mencapai sasaran tahunan dan KPI, dan cekap menggunakan maklum balas dari pihak berkepentingan untuk memperbaiki perkhidmatan dan prestasi. | | | | | |
| (F8) Rangkaian kerjasama dan konteks luaran yang menggalakkan untuk inovasi termasuk penggunaan rangkaian yang berkesan, kerjasama dengan organisasi inovatif lain dari sektor lain, dan memastikan organisasi menerima manfaat daripada dasar kerajaan, inisiatif, undang-undang dan pengawalan yang membantu memupuk inovasi. | | | | | |

Bahagian 4: Maklumat Organisasi

S9. Di negara manakah terletaknya organisasi anda?

- | | |
|--|--|
| <input type="checkbox"/> Brunei Darussalam | <input type="checkbox"/> China |
| <input type="checkbox"/> Kemboja | <input type="checkbox"/> Japan |
| <input type="checkbox"/> Indonesia | <input type="checkbox"/> Korea Selatan |
| <input type="checkbox"/> Lao PDR | <input type="checkbox"/> India |
| <input type="checkbox"/> Malaysia | <input type="checkbox"/> Australia |
| <input type="checkbox"/> Myanmar | <input type="checkbox"/> New Zealand |
| <input type="checkbox"/> Filipina | <input type="checkbox"/> Lain-lain (Sila nyatakan) |
| <input type="checkbox"/> Singapura | |
| <input type="checkbox"/> Thailand | |
| <input type="checkbox"/> Vietnam | |

S10. Dalam sektor manakah organisasi anda?

- Sektor Awam / Kerajaan
- Sektor Akademik / Pendidikan
- Sektor Perniagaan Swasta
- Pertubuhan Bukan Kerajaan (NGO)
- Lain-lain (Sila nyatakan) _____

S11. Sila nyatakan nama organisasi anda

S12. Dari yang berikut, bidang sektor manakah berkaitan dengan fungsi utama dan mandat organisasi anda? (Anda boleh pilih lebih daripada satu jawapan)

- Sains, teknologi dan inovasi (STI)
- Teknologi maklumat dan komunikasi (ICT)
- Pentadbiran dan perkhidmatan awam
- Pendidikan dan pengajaran
- Budaya, pelancongan, sejarah, dan seni
- Sukan dan hiburan
- Pembuatan dan pengeluaran industri
- Sektor tenaga
- Pertanian dan makanan
- Penjagaan kesihatan dan perubatan
- Sumber asli dan alam sekitar
- Undang-undang, tentera dan keselamatan negara
- Sektor kewangan dan ekonomi
- Sektor hubungan luar negara dan diplomatik
- Pertubuhan bukan kerajaan (NGO)
- Lain-lain (Sila nyatakan) _____

S13. Adakah fungsi dan mandat organisasi anda berkenaan dengan membangunkan dan mendorong aktiviti sains, teknologi dan inovasi?

- Ya Tidak

S14. Berapakah bilangan kakitangan di organisasi anda?

- 1 – 50
- 51- 100
- 101 – 200
- 201 – 400
- 401 –700
- 701 –1000
- 1,001 – 2000
- Lebih daripada 2000

S15. Adakah organisasi anda sebuah agensi awam / kerajaan? Dalam kaji selidik ini, organisasi anda dianggap sebagai agensi awam atau kerajaan sekiranya ia mendapat kebanyakan bajet dan dananya daripada kerajaan kebangsaan, tempatan atau negeri.

Ya Tidak

Sekiranya jawapan anda untuk S15 adalah Ya, anda bekerja dengan organisasi awam. Sila teruskan ke S16 dan lengkapkan selebihnya tinjauan ini.

Sekiranya jawapan anda untuk S15 adalah Tidak, anda tidak bekerja dengan organisasi awam. Sila langkai Bahagian 5: Mengukur inovasi organisasi anda dan teruskan ke S20 di Bahagian 6: Persepsi orang ramai terhadap ASEAN COST dan kumpulan-kumpulan yang berkaitan dengannya.

Bahagian 5: Mengukur inovasi organisasi anda

S16. Sekiranya organisasi anda adalah sebuah agensi awam atau kerajaan, pada anggapan anda, apakah tahap agensi anda?

- Kementerian kebangsaan/negeri atau setaraf
- Sebuah agensi di bawah kementerian kebangsaan/negeri atau setaraf
- Sebuah bahagian di bawah sebuah agensi di bawah kementerian kebangsaan/negeri atau setaraf
- Lain-lain (Sila nyatakan) _____

S17. Jenis agensi awam atau kerajaan manakah organisasi anda?

- Agensi kerajaan antarabangsa (seperti Sekretariat ASEAN)
- Agensi kerajaan awam (e.g. pejabat pentadbiran pusat dalam kementerian)
- Syarikat milik negara
- Perbadanan awam kerajaan
- Organisasi awam berautonomi atau bebas
- Lain-lain (Sila nyatakan) _____

S18. Apakah motivasi atau sebab anda bekerja di agensi awam/kerajaan? Lebih daripada satu jawapan boleh dipilih.

- Jaminan pekerjaan
- Altruisme — ingin berkhidmat kepada orang ramai
- Gaji atau pendapatan yang menarik
- Perkembangan kerjaya
- Pakej insurans kesihatan dan/atau faedah lain
- Peluang untuk latihan atau pendidikan selanjutnya
- Memenuhi bon / kontrak bea pelajaran
- Lain-lain (Sila nyatakan) _____

Q19. Sila tandakan X pada skala 1-5 untuk pernyataan yang anda anggap paling mencerminkan organisasi anda, dimana:

- 1 = Sangat tidak bersetuju dengan pernyataan atau pernyataan tidak relevan
 2 = Tidak bersetuju dengan pernyataan
 3 = Sedikit bersetuju dengan pernyataan
 4 = Bersetuju dengan pernyataan
 5 = Sangat bersetuju dengan pernyataan

| Soalan | Perkara | Skala | | | | |
|--------|---|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT01 | Pekerja dalam organisasi saya sentiasa digalakkan untuk menghasilkan idea-idea baru dan kaedah original apabila menghadapi masalah di tempat kerja. | | | | | |
| IT02 | Organisasi saya sentiasa berusaha untuk menjadi kreatif dan inovatif untuk menghasilkan output baru dan lebih baik, dan perkhidmatan yang lebih baik kepada orang ramai. | | | | | |
| IT03 | Organisasi saya bertoleransi terhadap individu yang melakukan perkara dengan cara yang berbeza. | | | | | |
| IT04 | Pekerja boleh mencabar status quo bagaimana perkara dilakukan tanpa hukum. | | | | | |
| IT05 | Pekerja digalakkan berkomunikasi kepada setiap tahap di jabatan berlainan untuk berkongsi idea, berbincang amalan terbaik, melapor kesilapan dan kegagalan sebagai cara memperbaiki organisasi. | | | | | |
| IT06 | Pekerja digalakkan meneroka dan mencuba cara-cara baru membuat sesuatu untuk membolehkan mereka belajar daripada kesilapan, kerana tahu bahawa beberapa daripada mereka akan gagal. | | | | | |
| IT07 | Organisasi saya menyediakan mekanisme sokongan, insentif, dan ganjaran untuk semua | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|---|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | kakitangan mengambik risiko yang munasabah untuk melaksanakan kerja mereka dengan baik. | | | | | |
| IT08 | Organisasi saya sentiasa menyelaraskan operasi dan proses kerja untk menjadi lebih cekap dan kurang birokratik. | | | | | |
| IT09 | Organisasi saya boleh digambarkan sebagai fleksibel dan berterusan menyesuaikan diri dengan perubahan dan cabaran. | | | | | |
| IT10 | Pemimpin atasan organisasi saya memperlakukan kakitangan sebagai individu, memberi galakkan, dan menyokong perkembangan mereka. | | | | | |
| IT11 | Pemimpin atasan organisasi saya memberi menteri-menteri dan kerajaan mereka nasihat pakar secara terus-terang berdasarkan kajian dan petunjuk sokongan. | | | | | |
| IT12 | Pemimpin atasan organisasi saya sering memberitahu dan melibatkan pekerja dalam proses membuat keputusan. | | | | | |
| IT13 | Pemimpin atasan organisasi saya bertindak sebagai pemangkin untuk perubahan yang membina dan mencuba memindahkan halangan kepada kejayaan organisasi. | | | | | |
| IT14 | Pemimpin atasan organisasi saya memberi peluang, alat dan persekitaran yang mendorong untuk pekerja menjadi inovatif dan berjaya dalam kerjaya mereka. | | | | | |
| IT15 | Pemimpin atasan organisasi saya benar-benar komited terhadap menjalankan organisasi dengan integriti untuk berkhidmat kepada orang ramai dan mewujudkan kesan sosial yang | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|--|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | positif. | | | | | |
| IT16 | Peluang baharu dan cabaran berkenaan dengan masyarakat adalah diiktirafkan dan diintegrasikan dalam pelan strategik dan operasi projek organisasi. | | | | | |
| IT17 | Pembangunan dan promosi inovasi adalah sebahagian misi strategik dan mandat organisasi saya. | | | | | |
| IT18 | Matlamat strategik, mandat dan dasar organisasi saya adalah dikongsi dan disampaikan dengan tutur kepada semua pekerja. | | | | | |
| IT19 | Pemimpin atasan organisasi saya membangunkan pandangan yang jelas mengenai tujuan akhir yang tinggi dan boleh dicapai lebih daripada objektif jangka pendek yang kurang penting. | | | | | |
| IT20 | Dalam organisasi saya, matlamat kerja pekerja adalah jelas ditakrifkan berdasarkan kriteria yang boleh diukur dan diselaraskan dengan objektif organisasi dan KPI. | | | | | |
| IT21 | Dalam organisasi saya, terdapat mekanisme dan operasi susulan strategik yang berkesan untuk menyokong perubahan dasar, keutamaan dan mandat kerajaan yang tidak dijanka. | | | | | |
| IT22 | Pekerja dalam organisasi saya sanggup berusaha melebihi apa yang diharapkan untuk membantu organisasi berjaya dan kompetitif. | | | | | |
| IT23 | Pekerja dalam organisasi saya percaya bahawa kerja keras dan pencapaian mereka adalah diiktiraf, dihargai dan diganjar secara | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|--|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | berpatutan. | | | | | |
| IT24 | Pekerja dalam organisasi saya sentiasa bermotivasi dan mempunyai dorongan sendiri untuk menyampaikan perkhidmatan dan keputusan yang lebih baik kepada orang ramai. | | | | | |
| IT25 | Pekerja dalam organisasi saya berkemahiran tinggi dengan kecekapan dan kemahiran relevan yang berkenaan dengan tugas dan keperluan kerja mereka. | | | | | |
| IT26 | Pekerja dalam organisasi saya selalu berpeluang untuk menyertai latihan dan pendidikan lanjut yang bersesuaian dengan keperluan dan minat mereka untuk meningkatkan kemahiran dan pengetahuan mereka. | | | | | |
| IT27 | Pekerja dalam organisasi saya secara amnya diiktiraf sebagai sangat berbakat dan sangat berkebolehan dalam kerja mereka oleh organisasi lain yang mempunyai fungsi yang sama. | | | | | |
| IT28 | Organisasi saya mempunyai bajet yang cukup atau dana yang khas diperuntukkan untuk terus mengembangkan inisiatif baru dan program, produk, proses atau perkhidmatan yang lebih baik untuk orang ramai. | | | | | |
| IT29 | Organisasi saya mempunyai bajet yang cukup atau dana yang khas diperuntukkan untuk terus meningkatkan proses, amalan dan operasi kerja dalaman organisasi. | | | | | |
| IT30 | Organisasi saya melabur dalam unit penyelidikan dan pembangunan (R&D) | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|---|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | dalamnya yang mengeluarkan output baru secara berkesan dan menyampaikan hasil yang lebih baik. | | | | | |
| IT31 | Organisasi saya mengupah dan/atau bekerjasama dengan pakar-pakar luaran dalam aktiviti R&D untuk membangunkan projek baru dan produk atau perkhidmatan yang lebih baik untuk orang ramai. | | | | | |
| IT32 | Organisasi saya menyediakan rangkaian komputer yang boleh dipercayai dan selamat, akses internet jalur lebar yang cepat dan sambungan WiFi berkualiti tinggi yang memuaskan pada setiap masa. | | | | | |
| IT33 | Organisasi saya sentiasa menyediakan pekerja dengan bantuan penggunaan komputer yang boleh dipercayai dan penyelesaian masalah mengenai teknologi maklumat dan komunikasi (ICT). | | | | | |
| IT34 | Organisasi saya mempunyai laman web dalam bahasa tempatan dan bahasa Inggeris, dan sentiasa dikemas kini dengan projek semasa, berita terkini, produk dan perkhidmatan terbaru, terbitan, struktur organisasi, dan butiran kenalan untuk memaklumkan dan melibatkan diri dengan orang ramai secara nasional dan global. | | | | | |
| IT35 | Organisasi saya menggunakan teknologi maklumat dan komunikasi, platform media sosial, dan aplikasi telefon bimbit yang ada dengan sepenuhnya untuk meningkatkan operasi harian dan meluaskan lagi penglibatan | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|---|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | awam. | | | | | |
| IT36 | Organisasi saya mempunyai instrumen (seperti manual, pangkalan data dan prosedur organisasi) yang membolehkan apa yang telah dipelajari pada masa lalu untuk kekal sah dan membantu operasi kerja berjalan dengan lancar walaupun pekerja tidak kekal sama. | | | | | |
| IT37 | Pengurusan organisasi saya mempromosikan kerjasama bersilang antara bahagian-bahagian yang berlainan untuk mengongsi kepakaran dan mencapai keputusan dan hasil yang terbaik. | | | | | |
| IT38 | Pekerja dalam organisasi saya ditempatkan dengan baik dalam kedudukan atau pangkat yang bersesuaian dengan tanggungjawab, keupayaan dan kemahiran mereka. | | | | | |
| IT39 | Struktur pengurusan organisasi saya adalah saiz sesuai dan mempunyai rantaian perintah yang boleh menjalankan fungsi organisasi secara berkesan, dan juga cepat bertindak balas terhadap perubahan pelan, strategi dan operasi. | | | | | |
| IT40 | Unit-unit pengurusan dan sumber manusia organisasi saya berupaya mengembangkan, menaikkan pangkat dan menahan tenaga kerja yang berupaya dan berprestasi tinggi. | | | | | |
| IT41 | Pengurusan organisasi saya selalu memberi wawasan, maklum balas dan komen yang membantu mengenal pasti peluang berpotensi dan menyingkirkan masalah. | | | | | |
| IT42 | Pengurusan organisasi saya memastikan bahawa proses kerja dan perkembangan baru yang mungkin membantu organisasi secara | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|--|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | keseluruhannya biasanya dibincang dan dikongsi dengan semua pekerja. | | | | | |
| IT43 | Dalam tempoh tiga tahun yang lalu, organisasi saya dengan konsisten menghasilkan output inovatif (seperti produk dan perkhidmatan, paten, reka bentuk, hak cipta, projek, program dan dasar yang baru dan bertambah baik) yang memuaskan. | | | | | |
| IT44 | Dalam tempoh tiga tahun yang lalu, organisasi saya dengan konsisten menerbitkan sebilangan artikel penyelidikan dalam jurnal kebangsaan dan antarabangsa, dan juga terbitan kualiti tinggi seperti laporan rasmi, kertas putih dan surat berita yang membantu meningkatkan kesedaran masyarakat dan pengetahuan orang ramai. | | | | | |
| IT45 | Dalam tempoh tiga tahun yang lalu, organisasi saya dengan konsisten mencapai sasaran tahunan yang ditetapkan dan KPI. | | | | | |
| IT46 | Dalam tempoh tiga tahun yang lalu, berbanding dengan organisasi sejawat yang mempunyai fungsi dan mandat yang sama <i>dalam negara yang sama</i> , dengan konsisten, prestasi organisasi saya adalah lebih baik. | | | | | |
| IT47 | Dalam tempoh tiga tahun yang lalu, berbanding dengan organisasi sejawat yang mempunyai fungsi dan mandat yang sama <i>secara antarabangsa atau global</i> , dengan konsisten, prestasi organisasi saya adalah lebih baik. | | | | | |
| IT48 | Dalam tempoh tiga tahun yang lalu, organisasi saya secara rutin dan berkesan menanda aras | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|--|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | dan memberitahu keputusan dan prestasi kepada pemegang kepentingan luaran melalui laporan tahunan, mesyuarat pemegang kepentingan, forum perbincangan dalam talian, mesyuarat rangkaian, persidangan dan seminar. | | | | | |
| IT49 | Dalam tempoh tiga tahun yang lalu, organisasi saya secara rutin mengemas kini proses kerja dan operasi dalaman yang sedia ada yang menghasilkan peningkatan kecekapan, daya pengeluaran dan prestasi organisasi. | | | | | |
| IT50 | Dalam tempoh tiga tahun yang lalu, organisasi saya secara rutin mengendalikan tinjauan kepuasan pemegang kepentingan dan/atau pengguna, dan menggunakan maklum balas untuk meningkatkan operasi, amalan dan prestasi yang sedia ada secara berkesan. | | | | | |
| IT51 | Organisasi saya mempunyai sistem pengukuran prestasi yang berkesan dan cekap (seperti kad skor seimbang, <i>dashboard</i> pengurusan, kad laporan dan sistem pengesanan KPI) yang digunakan dan disusul oleh semua pekerja untuk memantau dan memastikan misi dan visi kejayaan adalah dikaitkan dengan dan dijadikan aktiviti and operasi unit organisasi yang benar. | | | | | |
| IT52 | Dalam tempoh tiga tahun yang lalu, organisasi saya secara berkesan dan cekap menggunakan <i>jabatan audit dalaman</i> yang berdikari dan adil yang sentiasa memantau, menilai, dan memberi maklum balas dan cadangan untuk meningkatkan operasi harian dan prestasi semua unit organisasi. | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|---|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT53 | Dalam tempoh tiga tahun yang lalu, organisasi saya mematuhi <i>audit luaran dan/atau panel pakar</i> yang berdikari dan adil yang menilai sasaran, KPI dan prestasi organisasi. | | | | | |
| IT54 | Organisasi saya mendirikan, menjaga dan menggunakan secara berkesan rangkaian kerjasama dan penyelidikan kerjasama <i>kebangsaan</i> dengan organisasi inovatif lain. | | | | | |
| IT55 | Organisasi saya mendirikan, menjaga dan menggunakan secara berkesan rangkaian kerjasama dan penyelidikan kerjasama <i>antarabangsa</i> dengan organisasi inovatif lain. | | | | | |
| IT56 | Organisasi saya melibatkan diri dan mendapat manfaat daripada kerjasama perkongsian merentasi sektor dengan agensi awam, perusahaan perniagaan swasta, universiti dan organisasi tidak berasaskan keuntungan lain. | | | | | |
| IT57 | Organisasi saya mendapat manfaat sepenuhnya daripada dasar kerajaan dan akta kebangsaan dan/atau tempatan yang mempromosikan inovasi dan aktiviti berkenaan dengan inovasi. (Contoh aktiviti berkenaan dengan inovasi termasuk pelaburan dalam R&D), pengambilalihan teknologi dan kepakaran, kerjasama merentasi sektor, dan penubuhan unit <i>spin-off</i> dan <i>spin-out</i>). | | | | | |
| IT58 | Organisasi saya dapat secara kostisten menerima sokongan luar dari kerajaan nasional dan/atau tempatan, dan/atau perniagaan atau yayasan swasta, untuk melabut dalam aktiviti berkenaan dengan inmovasi. | | | | | |

| Soalan | Perkara | Skala | | | | |
|--------|---|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| IT59 | Dasar kerajaan, undang-undang, akta, dan mandat dan iklim politik membantu memupuk inovasi dan aktiviti berkenaan dengan inovasi dalam organisasi saya. | | | | | |

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จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX 7

POINTinno.com user acceptance online survey

Part 1: Introduction

The purpose of this survey is to test user acceptance of **www.POINTinno.com** – an online software tool to measure organisational innovativeness of public agencies in ASEAN. The survey is part of an on-going research at Technopreneurship and Innovation Management Programme, Graduate School, Chulalongkorn University, Bangkok, Thailand.

It should take around 5-10 minutes to answer all the questions.

The online link to this survey is at
(<https://www.surveymonkey.com/r/P2RNHSB>)

If you have further enquiry, please contact the researcher at
APOINTsurvey@gmail.com.

Thank you for using POINTinno.com and completing this survey.

Part 2: General information of users

Q1. Please provide your name.

First name: _____
Surname: _____

Q2. Please provide your contact email.

Email: _____

Q3. Please provide the name of your organisation.

- SBC (Sarawak Biodiversity Centre), Malaysia
- DOST (Department of Science and Technology), Philippines
- NSTDA (National Science and Technology Development Agency), Thailand
- STI (National Science Technology and Innovation Policy Office), Thailand
- Others. Please specify

Q4. What is your gender?

- Male Female Others

Q5. What is your age?

- Below 25 years old
 25-35 years old
 36-45 years old
 46-55 years old
 56-65 years old
 More than 65 years old

Q6. What is your current position?

- Top executive director, deputy director, or equivalent
 Middle management
 Senior employee
 Junior employee
 Student/ Training

Q7. How long have you been in your current position?

- Less than 1 year
 1-3 years
 4-6 years
 More than 6 years

Q8. How long have you been with your organisation?

- Less than 1 year
 1-5 years
 6-10 years
 11-20 years
 More than 20 years

Q9. What is your highest education qualification?

- Ph.D.
 Master's degree
 Bachelor's degree
 Below Bachelor's degree

Q10. What are your areas of expertise and formal qualifications? (More than one answer can be selected)

- Science, technology, engineering, and mathematics (STEM)
- Healthcare and medicine
- Industry, trading, and manufacturing
- Education and teaching
- Economy, finance, and accountancy
- Management and business administration
- Politics and public policy
- Laws and security enforcement
- Social studies (including arts, culture, history, sports, media, and entertainment)
- Others (Please specify) _____

Q11. Have you ever used any programs, software, or tools apart from POINTinno.com to measure or manage innovation or innovativeness?

- Yes, I have.
- No, I have not.

If answer yes, please provide the names of the programs or tools.

Q12. Does your organisation use any programs, software, or tools to measure or manage innovation or innovativeness?

- Yes.
- No.

If answer yes, please provide the names of the programs or tools.

Part 3: User experience of POINTinno.com

Q13. Please select ✓ on the scale from 1-5 to the following statements that you believe to be the most reflective of your experience in using **POINTinno.com** in which:

- 1 = Totally disagree
- 2 = Disagree
- 3 = Neither disagree or agree
- 4 = Agree
- 5 = Totally agree

| Item | User experience | Scale 1-5 | | | | |
|------|---|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | <i>Perceived Usefulness</i> | | | | | |
| U01 | The results of POINT Index Scores and the level of organisational innovativeness are useful for me and my organisation. | | | | | |
| U02 | POINTinno.com can effectively measure and compare different aspects of organisational innovativeness. | | | | | |
| U03 | This online tool can help assist leaders and managers to improve organisational performance and competitiveness. | | | | | |
| U04 | This online tool can help determine what areas of innovativeness should be improved. | | | | | |
| | <i>Perceived Ease of Use</i> | | | | | |
| U05 | The instruction on how to use the online tool is clear and easy to follow. | | | | | |
| U06 | The recommendations on how to improve innovativeness are clear and possible to be implemented. | | | | | |
| U07 | The method to measure organisational innovativeness by average user ratings and weighted sum score are simple to understand. | | | | | |
| U08 | The slide bar option for item rating is well designed and user friendly. | | | | | |
| U09 | This online tool can be easily accessed anywhere, anytime, from any devices. | | | | | |
| U10 | This online tool can be used and compatible the standard software and operating system on my computer, tablet, or smartphone. | | | | | |
| U11 | Overall this online tool is easy to use and does not require much of my effort. | | | | | |
| | <i>Behavioural Intention to Use</i> | | | | | |

| Item | User experience | Scale 1-5 | | | | |
|------|---|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| U12 | This online tool can be used as part of my organisation strategic planning. | | | | | |
| U13 | This online tool can be used as part of my organisation performance indicators. | | | | | |
| U14 | I intend to use this online tool again in the future to compare my results with others. | | | | | |
| U15 | I think other staff in my organisation should use this online tool as well. | | | | | |
| U16 | Overall, this online tool is suitable to be used in my organisation. | | | | | |

Q14. Are there any aspects of POINTinno.com that you think should be improved? Please give suggestions.

Part 4: Commercialisation potential

Q15. What type of the following subscription options you might be interested in for using POINTinno.com to assess your organisational innovativeness?

- Option 1: *Non-membership limited access* to the online tool within 1 year without expert consultation session.
- Option 2: *Membership subscription to the online tool for 1 year with unlimited access* via a one-off subscription fee. Plus free consultation session with experts on how to improve various aspects of your organisation innovation and innovativeness.
- Option 3: *Membership subscription to the online tool for 3 years with unlimited access* via a discount annual membership fee. Plus free consultation session with experts on how to improve various aspects of your organisation innovation and innovativeness.
- Other options. Please recommend.

Q16. As a potential user, how much are you willing to pay to use POINTinno.com to measure and assess your organisational innovativeness?

| | |
|-------|--|
| _____ | Per access |
| _____ | For annual subscription fee <i>without</i> expert consultation session |
| _____ | For annual subscription fee <i>with</i> expert consultation session |

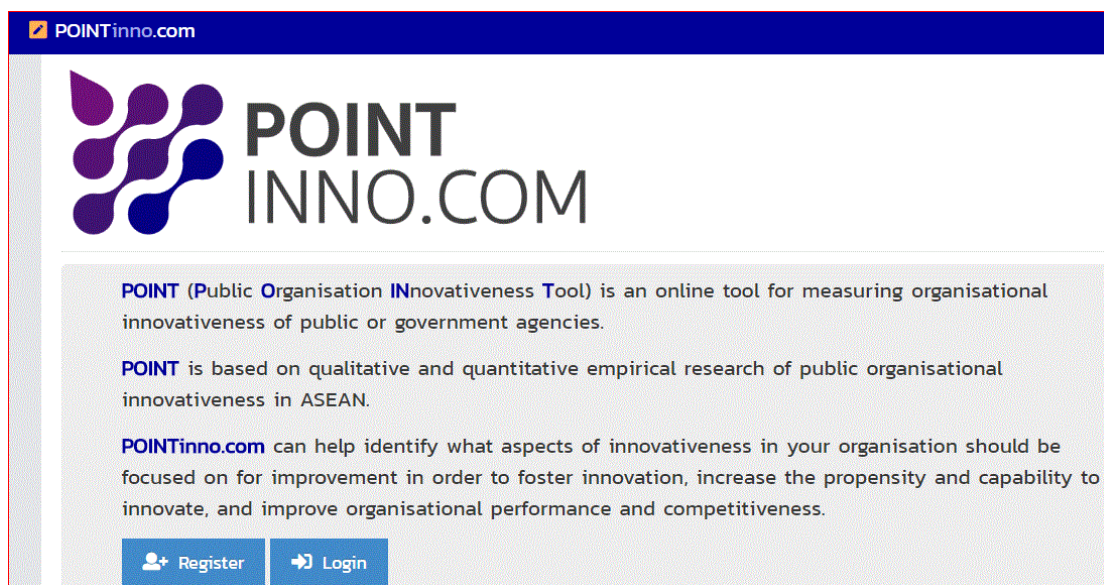
Q17. Please provide any comments or recommendations (if there are any).

Thank you for using POINTinno.com and complete this survey.




APPENDIX 8

Frontend: How users access the program



POINT Inno.com

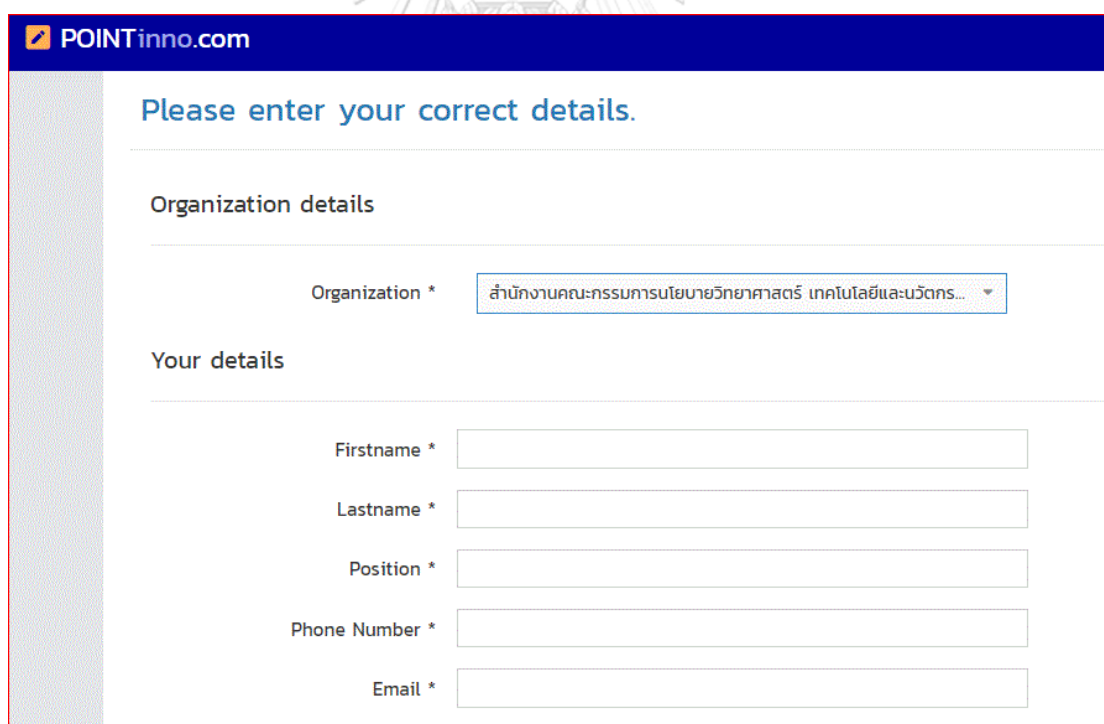
 **POINT
INNO.COM**

POINT (Public Organisation INnovativeness Tool) is an online tool for measuring organisational innovativeness of public or government agencies.

POINT is based on qualitative and quantitative empirical research of public organisational innovativeness in ASEAN.

POINT Inno.com can help identify what aspects of innovativeness in your organisation should be focused on for improvement in order to foster innovation, increase the propensity and capability to innovate, and improve organisational performance and competitiveness.

[Register](#) [Login](#)



POINT Inno.com

Please enter your correct details.

Organization details

Organization *

Your details

Firstname *

Lastname *

Position *

Phone Number *

Email *

POINTinno.com en Welcome, apointsurvey@...

Instruction for Users of POINTinno.com

POINTinno.com is developed to measure the innovativeness of your organisation based on your answers to the item statements that reflect the current situation in each area of the organisational innovativeness.

The scores on each item statement are from 1.0 to 5.0 and the slider on the scale can be selected with the increment of 0.1. You can also directly type your assessment score on top of the provided default number 3.0.

Please select a score on each item statement to reflect the current situation of your organisation in which:

- 1.0 = **Strongly disagree** with the statement or the statement is not relevant
- 2.0 = **Disagree** with the statement
- 3.0 = **Slightly agree** with the statement
- 4.0 = **Agree** with the statement
- 5.0 = **Strongly agree** with the statement

After you complete all the question statements, the Program will calculate the **POINT Index Score** of your own rating as well as the average score rated by other users in your organisation in comparison with other public agencies in your country and globally.

Factor 1 : Culture Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|--|-------------------|----------|----------------|-------|----------------|
| F11 Employees in my organisation are always encouraged to come up with new ideas and original approaches when dealing with problems in the workplace. | 3.0 | | | | |
| F12 My organisation is constantly seeking to be creative and innovative in order to deliver new and better outputs and improved services to the public. | 3.0 | | | | |
| F13 My organisation tolerates individuals who do things in a different way. | 3.0 | | | | |
| F14 Employees can reasonably challenge the status quo of how things are done without being penalised. | 3.0 | | | | |
| F15 Employees are encouraged to communicate at all levels across different departments in order to share ideas, discuss best practices, report errors and failures as a way to improve the organisation. | 3.0 | | | | |
| F16 Employees are encouraged to explore and try new ways of doing things to learn from their mistakes, knowing well that some will fail. | 3.0 | | | | |
| F17 My organisation provides supportive mechanisms, incentives, and rewards for all staff to take reasonable risks in order to perform better in their jobs. | 3.0 | | | | |
| F18 My organisation constantly streamlines internal operations and work processes in order to be more efficient and become less bureaucratic. | 3.0 | | | | |
| F19 My organisation can be described as flexible and continually adapting to changes and challenges. | 3.0 | | | | |

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Factor 2 : Leader Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------|-------|----------------|
| F21 Top leaders of my organisation treat staff as individuals, give encouragements, and support their developments. | | | | | |
| F22 Top leaders of my organisation provide their ministers and government with frank expert advices based on research and supporting indications. | | | | | |
| F23 Top leaders of my organisation often keep employees informed and involved in important decision making processes. | | | | | |
| F24 Top leaders of my organisation act as catalysts of constructive changes and seek to remove barriers for the organisation to succeed. | | | | | |
| F25 Top leaders of my organisation provide opportunities, tools, and supporting environment for the employees to be innovative and able to succeed in their jobs. | | | | | |
| F26 Top leaders of my organisation are genuinely committed to operate the organisation with integrity to serve the public and create positive social impact. | | | | | |

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Factor 3 : Strategy Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------|-------|----------------|
| F31 New opportunities and societal challenges are effectively recognised and successfully integrated into the organisation strategic plans and project operations. | | | | | |
| F32 Innovation development and promotion are part of strategic missions and mandates of my organisation. | | | | | |
| F33 The strategic goals, mandates, and policies of my organisation are shared and articulately conveyed to all employees. | | | | | |
| F34 Top leaders of my organisation develop clear view of ambitious and achievable final aims more than less significant short-term objectives. | | | | | |
| F35 In my organisation, employee work goals are clearly defined against measureable criteria and are aligned to the organisation's objectives and KPIs. | | | | | |
| F36 In my organisation, there are effective strategic follow-through mechanisms and operations to support unexpected changes of government policies, priorities, or mandates. | | | | | |

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Factor 4 : Workforce Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|--|-------------------|----------|----------------|-------|----------------|
| F41 Employees in my organisation are willing to put in a great deal of effort beyond that normally required in order to help the organisation to be successful and competitive. | | | | | |
| F42 Employees in my organisation believe that their hard work and achievements are justly recognised, appreciated, and well rewarded. | | | | | |
| F43 Employees in my organisation are constantly motivated and self-driven to deliver better services and improved results to the public. | | | | | |
| F44 Employees in my organisation are highly skilled with competency and relevant expertise suitable to their job requirements and duties. | | | | | |
| F45 Employees in my organisation often have opportunities to participate in trainings and further educations that suit their needs and interests in order to improve their skills and knowledge. | | | | | |
| F46 employees in my organisation are generally recognised as very talented and highly capable in their jobs by other organisations with similar functions. | | | | | |

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Factor 5 : Resource Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------|-------|----------------|
| F5.1 My organisation has sufficient budgets or funds purposely allocated to continually develop new initiatives and better programmes, products, processes or services to the public. | 3.0 | | | | |
| F5.2 My organisation has sufficient budgets or funds specifically allocated to continually improve internal work processes, practices, and operations of the organisation. | 3.0 | | | | |
| F5.3 My organisation invests in in-house research and development (R&D) unit that effectively produce new outputs and deliver better results. | 3.0 | | | | |
| F5.4 My organisation hires and/or collaborates with external experts in R&D activities in order to develop new projects and better products or services to the public. | 3.0 | | | | |
| F5.5 My organisation provides reliable and secure computer network, fast internet broadband access, and satisfactory high quality Wi-Fi connections for all employees at all times. | 3.0 | | | | |
| F5.6 My organisation constantly provide all employees with reliable assistance in computer usages and solving ICT related problems. | 3.0 | | | | |
| F5.7 My organisation has official website in local and English languages and regularly updates it with current projects, up to date news, latest products and services, publications, organisational structures, and contact details in order to inform and engage with the public nationally and globally. | 3.0 | | | | |
| F5.8 My organisation makes full use of available information and communication technologies, social media platforms, and mobile phone applications to improve daily operations and widen public engagement. | 3.0 | | | | |

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Factor 6 : Management Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|--|-------------------|----------|----------------|-------|----------------|
| F6.1 My organisation has instruments (e.g. manuals, databases, and organisational procedures) that allow what has been learnt in the past to remain valid and help smoothen work operations although the employees are no longer the same. | 3.0 | | | | |
| F6.2 Management of my organisation promotes cross-functional teamwork among different divisions in order to share expertise and achieve the best results and outcomes. | 3.0 | | | | |
| F6.3 Employees of my organisation are well placed in positions or ranks suitable to their responsibilities, capabilities and skills. | 3.0 | | | | |
| F6.4 The management structure of my organisation is of suitable size and chains of commands that can effectively carry out the organisational functions as well as quickly response to changes in plans, strategies, and operations. | 3.0 | | | | |
| F6.5 Management and human resource units of my organisation are capable of developing, promoting and retaining talented or high performing workforces. | 3.0 | | | | |
| F6.6 Management of my organisation can often provide useful insights, feedbacks and comments that help to identify potential opportunities and eliminate problems. | 3.0 | | | | |
| F6.7 Management of my organisation ensures that new work processes and developments that may be helpful to the organisation as a whole are usually discussed and shared with all employees. | 3.0 | | | | |

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Factor 7 : Performance Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|--|-------------------|----------|----------------|-------|----------------|
| F7.1 In the last three years, my organisation has consistently produced satisfactory innovative outputs such as new and improved products and services, patents, designs, copyrights, projects, programmes, and policies to serve the public. | 3.0 | | | | |
| F7.2 In the last three years, my organisation has consistently published a number of research articles in referenced national and international journals as well as other high quality publications such as official reports, white papers, and newsletters that help enhance society awareness and public knowledge. | 3.0 | | | | |
| F7.3 In the last three years, my organisation has consistently achieved its annual set targets and KPIs. | 3.0 | | | | |
| F7.4 In the last three years in comparison with other peer organisations with similar functions and mandates in the same country, my organisation consistently outperforms them. | 3.0 | | | | |
| F7.5 In the last three years, in comparison with other peer organisations with similar functions and mandates internationally or globally, my organisation consistently outperforms them. | 3.0 | | | | |
| F7.6 In the last three years, my organisation routinely and effectively benchmarks and communicates its results and performances to external stakeholders via annual reports, stakeholders meetings, online discussion forums, network meetings, conferences and seminars. | 3.0 | | | | |
| F7.7 In this last three years, my organisation routinely updates existing internal work processes and operations that result in improvement of organisational efficiency, productivity, and performance. | 3.0 | | | | |
| F7.8 In the last three years, my organisation routinely conducts stakeholders' and/or users' satisfactory surveys and effectively utilises the feedbacks to improve the existing operation, practice, and performance. | 3.0 | | | | |
| F7.9 My organisation has effective and efficient performance measurement system in place (e.g. balanced scorecard, management dashboard, report card, and KPI tracking system) that are utilised and follow-through by all employees to monitor and ensure that the mission and vision of success are linked and translated to actual organisational unit activities and operations. | 3.0 | | | | |
| F7.10 In the last three years, my organisation has effectively and efficiently utilised independent, and impartial internal audit department that constantly monitors, evaluates, and provides feedbacks and recommendations to improve daily operations and performance of all organisational units. | 3.0 | | | | |
| F7.11 In the last three years, my organisation has been successfully complied with independent and impartial external audit and/or panel of experts that evaluates its targets, KPIs and performance. | 3.0 | | | | |



Factor 8 : Network and External Context Innovativeness

| | Strongly Disagree | Disagree | Slightly Agree | Agree | Strongly Agree |
|--|-------------------|----------|----------------|-------|----------------|
| F8.1 My organisation establishes, maintains, and effectively utilises national collaborative networks and research cooperation with other innovative organisations. | 3.0 | | | | |
| F8.2 My organisation establishes, maintains, and effectively utilises international collaborative networks and research cooperation with other innovative organisations. | 3.0 | | | | |
| F8.3 My organisation engages with and benefits from cross-sectoral collaborative partnerships with other public agencies, private business enterprises, universities and non-profit organisations. | 3.0 | | | | |
| F8.4 My organisation fully benefits from national and/or local government policies and regulations that promote innovations and innovation related activities. (Examples of innovation related activities include R&D investment, technologies and knowhow acquisition, cross-sectoral collaborations, and setting up of spin-off and spin-out units). | 3.0 | | | | |
| F8.5 My organisation is consistently able to receive external supports from the national and/or local governments and/or private businesses or foundations to invest in innovation related activities. | 3.0 | | | | |
| F8.6 Government policies, laws, regulations, and political mandates and climates help foster innovation and innovation related activities in my organisation. | 3.0 | | | | |

← Back

→ Next

Backend: Administrative setup functions and data storage

แก้ไขข้อมูลชุดคำถาม >> |

Active
 Category *

Name * en

Code *

| Factor code | Factor short name | Factor name en | Description en | Factor weight |
|-------------|-------------------|------------------------------|---|---------------|
| 1 | F1 | Culture | Factor 1 - Culture Innovativeness <i>Culture Innovativeness is the organisational nor...</i> | 0.1299 |
| 2 | F2 | Leader | Factor 2 - Leader Innovativeness <i>Leader Innovativeness refers to the organisat...</i> | 0.1328 |
| 3 | F3 | Strategy | Factor 3 - Strategy Innovativeness <i>Strategy Innovativeness refers to strategic init...</i> | 0.1224 |
| 4 | F4 | Workforce | Factor 4 - Workforce Innovativeness <i>Workforce Innovativeness refers to the organisat...</i> | 0.1283 |
| 5 | F5 | Resource | Factor 5 - Resource Innovativeness <i>Resources & Infrastructure Innovativeness refers...</i> | 0.1241 |
| 6 | F6 | Management | Factor 6 - Management Innovativeness <i>Management Innovativeness in public organisation...</i> | 0.1258 |
| 7 | F7 | Performance | Factor 7 - Performance Innovativeness <i>Performance Innovativeness can be measured based...</i> | 0.1154 |
| 8 | F8 | Network and External Context | Factor 8 - Network and External Context Innovativeness <i>Networks & External Contexts Innovativeness refe...</i> | 0.1213 |



















จัดการข้อสอบ

Create

| Factor | Order | Question | Weight |
|--------|-------|--|--------|
| F1 | 1 | Employees in my organisation are always encouraged to come up with new ideas and original approaches when dealing with problems in the workplace. | 3.284 |
| F1 | 2 | My organisation is constantly seeking to be creative and innovative in order to deliver new and better outputs and improved services to the public. | 3.242 |
| F1 | 3 | My organisation tolerates individuals who do things in a different way. | 1.653 |
| F1 | 4 | Employees can reasonably challenge the status quo of how things are done without being penalised. | 2.775 |
| F1 | 5 | Employees are encouraged to communicate at all levels across different departments in order to share ideas, discuss best practices, report errors and failures as a way to improve the organisation. | 3.347 |
| F1 | 6 | Employees are encouraged to explore and try new ways of doing things to learn from their mistakes, knowing well that some will fail. | 3.051 |
| F1 | 7 | My organisation provides supportive mechanisms, incentives, and rewards for all staff to take reasonable risks in order to perform better in their jobs. | 0.699 |
| F1 | 8 | My organisation constantly streamlines internal operations and work processes in order to be more efficient and become less bureaucratic. | 0.953 |
| F1 | 9 | My organisation can be described as flexible and continually adapting to changes and challenges. | 0.996 |
| F2 | 1 | Top leaders of my organisation treat staff as individuals, give encouragements, and support their developments. | 2.981 |
| F2 | 2 | Top leaders of my organisation provide their ministers and government with frank expert advices based on research and supporting indications. | 2.332 |
| F2 | 3 | Top leaders of my organisation often keep employees informed and involved in important decision making processes. | 3.101 |
| F2 | 4 | Top leaders of my organisation act as catalysts of constructive changes and seek to remove barriers for the organisation to succeed. | 7.139 |
| F2 | 5 | Top leaders of my organisation provide opportunities, tools, and supporting environment for the employees to be innovative and able to succeed in their jobs. | 2.957 |
| F2 | 6 | Top leaders of my organisation are genuinely committed to operate the organisation with integrity to serve the public and create positive social impact. | 1.49 |
| F3 | 1 | New opportunities and societal challenges are effectively recognised and successfully integrated into the organisation strategic plans and project operations. | 0.703 |
| F3 | 2 | Innovation development and promotion are part of strategic missions and mandates of my organisation. | 0.673 |

Manage Registrants





















[Create](#)

| ID | Firstname | Lastname | Phone Number | Email | Position | Organization | |
|----|------------|-------------|--------------|-------------------------|--------------------------|--|---|
| 40 | Kawee patt | Churcharoen | 0999522400 | lightingsuns@gmail.com | นางสาว | สำนักงานคณะกรรมการนโยบายวิทยาศาสตร์ เทคโนโลยีและนวัตกรรมแห่งชาติ (สอวท.) |    |
| 41 | Kawee patt | Churcharoen | 0999522400 | lightingsuns2@gmail.com | Test | สำนักงานคณะกรรมการนโยบายวิทยาศาสตร์ เทคโนโลยีและนวัตกรรมแห่งชาติ (สอวท.) |    |
| 42 | Kittikun | Kingkaew | 0840845000 | kittikun-4k@gmail.com | Project Manager | สำนักงานคณะกรรมการนโยบายวิทยาศาสตร์ เทคโนโลยีและนวัตกรรมแห่งชาติ (สอวท.) |    |
| 43 | ฉวีพร | พิชญ์ | +6653148840 | salinthiphd@gmail.com | นักพัฒนายุทธศาสตร์ | สำนักงานคณะกรรมการนโยบายวิทยาศาสตร์ เทคโนโลยีและนวัตกรรมแห่งชาติ (สอวท.) |    |
| 44 | Salinthip | Thipayang | 0853648840 | apointsurvey@gmail.com | Senior Policy Researcher | สำนักงานคณะกรรมการนโยบายวิทยาศาสตร์ เทคโนโลยีและนวัตกรรมแห่งชาติ (สอวท.) |    |
| 45 | Salinthip | Thipayang | Test | salinthip@gmail.com | Test | POINTInno Test Org |    |

Showing 1 to 6 of 6 entries

Examination Results

[Information](#) [รายชื่อผู้เข้าสอบ \(10\)](#)

| Created Time | Subject | Result | |
|------------------------|--|---|---|
| 20 มิถุนายน 2018 21:26 | Public Organisation Innovationess Tool |  |  |
| 26 มิถุนายน 2018 01:17 | Public Organisation Innovationess Tool |  |  |
| 26 มิถุนายน 2018 01:18 | Public Organisation Innovationess Tool |  |  |
| 28 มิถุนายน 2018 01:46 | Public Organisation Innovationess Tool |  |  |
| 29 มิถุนายน 2018 14:55 | Public Organisation Innovationess Tool |  |  |
| 12 กรกฎาคม 2018 01:47 | Public Organisation Innovationess Tool |  |  |
| 24 กรกฎาคม 2018 22:32 | Public Organisation Innovationess Tool |  |  |
| 25 กรกฎาคม 2018 12:40 | Public Organisation Innovationess Tool |  |  |
| 25 กรกฎาคม 2018 12:54 | Public Organisation Innovationess Tool |  |  |
| 25 กรกฎาคม 2018 14:59 | Public Organisation Innovationess Tool |  |  |

Showing 1 to 10 of 10 entries



VITA

Miss Salinthip Thipayang was born on 15 June 1977 in Bangkok, Thailand. When she was seven years old, her father Mr. Dumrong Thipayang passed away unexpectedly from a sudden fatal accident leaving behind her mother Mrs. Jiraporn Thipayang, Miss Salinthip, and her three years old younger brother Mr. Thammathip Thipayang.

Miss Salinthip had always been able to do well in her studies since childhood and was always among the top three students of her classes from primary school to high school levels. After completing her secondary school education from Satreesamutprakarn school, she received the sponsorship from the Ministry of Education of Thailand to study at Sriboonyanon school in Nontaburi. Miss Salinthip participated in the school extracurricular activities and was elected as the Student President. All her academic and extracurricular excellence was recognised when she was awarded The National Student Excellence Badge of Honors from the then Prime Minister Mr. Chuan Leekpai on the Children Day in January 1995.

In April 1995, Miss Salinthip received the DPST scholarship to study in the United Kingdom. She studied and graduated with First Class Honors in M.Sc. Chemistry in 2001 from Imperial College, London, UK. She met and married her husband Dr. Allan Fernando Hon in the UK and after ten years of marriage their son Master Huxley Anantakhun Hon was born in 2015.

Miss Salinthip worked as a Research Analyst at OSK Investment Bank in Malaysia and then as a Senior Policy Researcher at National Science Technology and Innovation Policy Office, Ministry of Science and Technology of Thailand. Her roles at STI Office involved the strategic partnerships and policy research with the ASEAN Committee on Science and Technology (COST) networks. This inspired her to enroll in the Ph.D study at Technopreneurship and Innovation Management Program at Chulalongkorn University and developed POINTinno.com as an online application to measure organisational innovativeness of public agencies in ASEAN.



จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY