AN APPLICATION OF TRANSPARENCY IN UP STREAM SUPPLY CHAIN OF THAI FROZEN FOOD COMPANY

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Transparency has gain its importance in supply chain management dimension in the past decades. Implementing the transparency concept through information sharing can enhance the relationship among suppliers and holistically improve the supply chain management. The proposed transparency in this research was configured to be fit with the firm's scale.

The methodology of transparency framework design was based upon the AS-IS analysis of both ABC company and the suppliers' current situation and process flow. The area of improvement was identified along that AS-IS analysis to configure the proposed model to be at it's most optimum. The main theme of the transparency model was greatly leveraged the benefit of information sharing scheme enhancing the communication and process efficiency of the two.

The results obtained from the transparency framework implemented was very satisfied. The scrap rate was decreased down by 25.81% due to the communication interacted. Moreover, the information sharing scheme was also plunged the safety-inventory level by 30.19%. Therefore, adopting the most optimum transparency levels that fit with the corporate's uniqueness and constraints will increase the convergence of information as well as to enhance the relationship level with strategic suppliers in the longer business term.

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ในปัจจุบัน การบริหารจัดการแบบโปร่งใสของระบบบริหารห่วงโซ่อุปทานได้เข้ามามีบทบาทมากมายในการเพิ่มประสิทธิผลของการสื่อสารระหว่างองค์กร รวมทั้งช่วยกระชับความสัมพันธ์ระหว่างคู่ค้าแบบองค์รวมผ่านการใช้ข้อมูลร่วมกันระหว่างองค์กร ในที่นี้ การออกแบบระบบการทำงานแบบโปร่งใสได้จัดทำขึ้นตามความเหมาะสมของขนาดองค์กรและข้อจำกัดทางธุรกิจ โดยอิงถึงการวิเคราะห์ความเป็นไปได้จากข้อมูลพื้นฐานและระบบทำงานเดิมของบริษัทซึ่งวิเคราะห์เฉพาะห่วงโซ่อุปทานช่วงต้นเท่านั้น งานวิจัยชิ้นนี้ได้ระบุถึงส่วนของระบบเดิมที่ควรปรับปรุง เพื่อนำไปออกแบบกรอบการทำงานแบบโปร่งใส รวมถึงกำหนดขอบข่ายของการใช้ข้อมูลร่วมกันในระดับต้น เพื่อทดสอบความเป็นไปได้ของการเปลี่ยนระบบการทำงานให้มีความโปร่งใสมากขึ้น

ผลการวิจัยชี้ชัดว่า การบริหารจัดการแบบโปร่งใสสามารถลดความผิดพลาดทางการผลิตได้มากถึง 25.81% รวมทั้งสามารถลดปริมาณของสินค้าคงคลังลงจากเดิม 30.19% ซึ่งส่งผลต่อการลดลงของต้นทุนในการผลิตแบบบูรณการ อนึ่ง รูปแบบของกรอบการทำงานบริหารจัดการแบบโปร่งใสนั้นไม่มีลักษณะตายตัว กรอบการทำงานควรมีการปรับเปลี่ยนรูปแบบให้เข้ากับวัฒนธรรมองค์กรและข้อจำกัดทางธุรกิจจึงจะสามารถช่วยเสริมสร้างความสัมพันธ์กับคู่ค้าในระยะยาว

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CHAPTER I
INTRODUCTION

Through the past decades of enhancing industrial productivity, transparency has underpinned its importance into play. In particular, adopting transparency into supply chain system has become one vital element towards strategic approach of partnership. Transparency in supply chain system can be very subjective as its intangible meaning, but manageable through many different approaches. To specified the meaning of the terms, transparency means the corporates' property of a system deployed by which the relationship between the two parties expose transparent behavior such as data accessible, resource sharing, and co-evaluation towards performance. To the extent of transparency concept, it consists of several elements to build such unique property towards partnership including goal congruence, equity sharing, top-down policy, and long-term relationship.

The mechanism of transparency was firmly believed that its effect can reduce market pressure by developing value through simplicity of market-based transaction (R. C. Lamming et al., 2001). The real focus of adopting transparency into supply chain system was not at product provision nor service facilities but pure relationship between business partners. Currently, the volatility of the market situation has been arisen along with many tough challenges that required brisk decision through good collaboration are vital. Furthermore, the burst of technology advancement has brought in many global competitors and the usage of e-commerce has put the volatility of the market to be higher.

The greater amount of global competitors emerging into the same market has made the need for responsiveness to changes, opportunities, and threat with greater attention. Classical approach on business dealing technique might not be

appropriate based upon current market intensity. To be adept in such thriving situation, being transparent through two-way sharing of information can lead the corporate to create new value chain between the firms and suppliers. To be more precise, the net effect of adopting transparency regarding the data provision can help support the firms to enhance it's operation system as well as leverage the benefits from that interchange through strategic relationship.

Focusing on food processing industry, nowadays, natural calamity is the major factor that intensify the situation. The severe situation of these natural effects can be listed from unpredictable weather, changing of seasonal patterns, and the dwindle of agricultural products. Referring to these natural calamity, the alleviated of agricultural products can lead food industry to suffocate with higher cost, raw material shortage, and unreliable quality of end-products. As stated, the consequences of these negative effects inhibit from those dilemmas are like dominos: once it hits one another and another, they were all fallen down. In addition, the rocketed of petroleum price has urged the ascertainment of alternative entry resources through agricultural cultivations.

The insufficient of food these days mainly came from the shifting trend in agricultural planation. The farmers shifted to plant energy crops rather than food-cultivation purpose. This energy crisis had provoked another dominos in food chain to face with crucial conflict. The decreasing yield of food cultivation raw material and unpredictable seasonality have adversed not only on certain area of the world but rather everywhere. Thailand has also affected greatly from these effects as it is major food provider of the world. In addition, swiftly changes in end customers had been burst with higher volatility and varieties of product preference than ever before.

Therefore, this is where the design of product packaging required such responsiveness of the system for itself to be adaptable quick enough to the market's need. This cycle has caused the products' life-span to be shorter and certainly keep contracting down each year with twice acceleration. The numerous difficulties in food industry stated above has caused all the players thriving in adapt either its business strategy or operating policy. Many corporates have exploited the leverage of "Partnership", while the others might found out other alternative schemes in improving its supply chain system. The seamlessly supply chain strategy can bring about the corporate competitive advantage in such harsh time.

From the government's report (Ministry of Industry and Thailand Food Institution, 2007), it informed that the government has set goal towards pushing Thai's food industry into bigger leap through promoting campaign "Thailand: Kitchen of the World". However, most of the players in Thai's food industry are small size enterprise and only few big players. The major challenging for all small scale entrepreneurs is at funding accessibility which funding problems had led SMEs to suffer with many others business difficulties. It's lack of negotiable potential with suppliers due to it's business scale had also pressurized SMEs to hold greater amount of cost while still gain lessen profits.

There are tremendous difficulties that kept SMEs from achieving their full benefits; lack of good managerial skills, ineffective supply chain system, limited access to source of fund, and the over-produced end product due to fluctuated bullwhip demand. Moreover, the secretiveness behavior of the organization and the inappropriate communication approach can also lead the corporates to such difficulties as there will be large amount of wasted generated from dead-stock and scrap from the raw material inventory brought in for avoiding those shortage uncertainties.

In short, adopting transparency concept through information sharing activity can help support both firms to strengthen its supply chain operational performance as well as to build trust for longer strategic relationship among partners. Learning from world-class corporates such as Toyota, Walmart, FedEx, it was proved that strength in their supply chain system clearly came from the transparent behavior of the networking (S.E. Fawcett et al. 2012). Among the globalized nature of the business that is shifting towards the globalization of the market, quality of the product alone is no longer enough for satisfied the endless needs of the end customers especially in this volatility of market situation.

Streamlining the supply chain structure and strategically plan for visionary roadmap towards transparency concept should help business component to work elaborately synchronized. The more congruence system among partners will support the company's advantage through the changing context of competition in which derived from the globalization of the modernized world. Transforming the way of doing business can be done through supply chain transparency of each party by exploiting the benefits of information sharing through the advancement of internet technology and communication innovation. These mutual collaborations among firms also strengthen the value chain of the whole network as trust and transparency of the system emerged along the vertical integration installed.

Hence, the consequential of implementing transparency into up-stream of the supply chain system was firmly believed to be an important and necessity step to be taken. In particular, this research will begin with the identification of an opportunity that should benefit both parties in embedded the transparency into the current situ. The conceptual design of this proposed transparency scheme will be customized to be at most fit for the uniqueness of organization's culture

and working habits in order to ease out the drawbacks of the current system and to strengthen the relationship between the two that aiming for longer term of strategic partnership.

1.1 Problem Background

The problem of the research is based along the ABC company's drawbacks of the supply chain network which the company is an SMEs frozen food producer. The products manufactured are ready-to-eat pizza and other baked snacks. The company firstly targeted to be the pioneer in the local market as its distribution channels are through modern trade: convenient stores, supermarkets, and hypermarkets. Currently, as the company grows, it also provides the OEM manufactured service for third-party companies in exporting to other foreign countries outside Thai's local market.

Unfortunately, the ABC company has been produced for export market more than the local one. By the fact that the local market was very competitive with other major players who had already filled most of the market gap. It is almost impossible to be the major player in this local market as the firm has no distribution channels of its own which it do need large amount of investment and time to build an effective team of distribution. Therefore, it would be easier to outsource the distribution channels of others than creating one in the extent of existing effective channels.

The aim goal of expanding the capacity of the operational line of the manufacturing, not only investment capitol is needed but also the strength of the supply chain expansion. However, there are many major problems do exist along the path of the management policy and the supply chain management in both downstream and upstream of the chain.

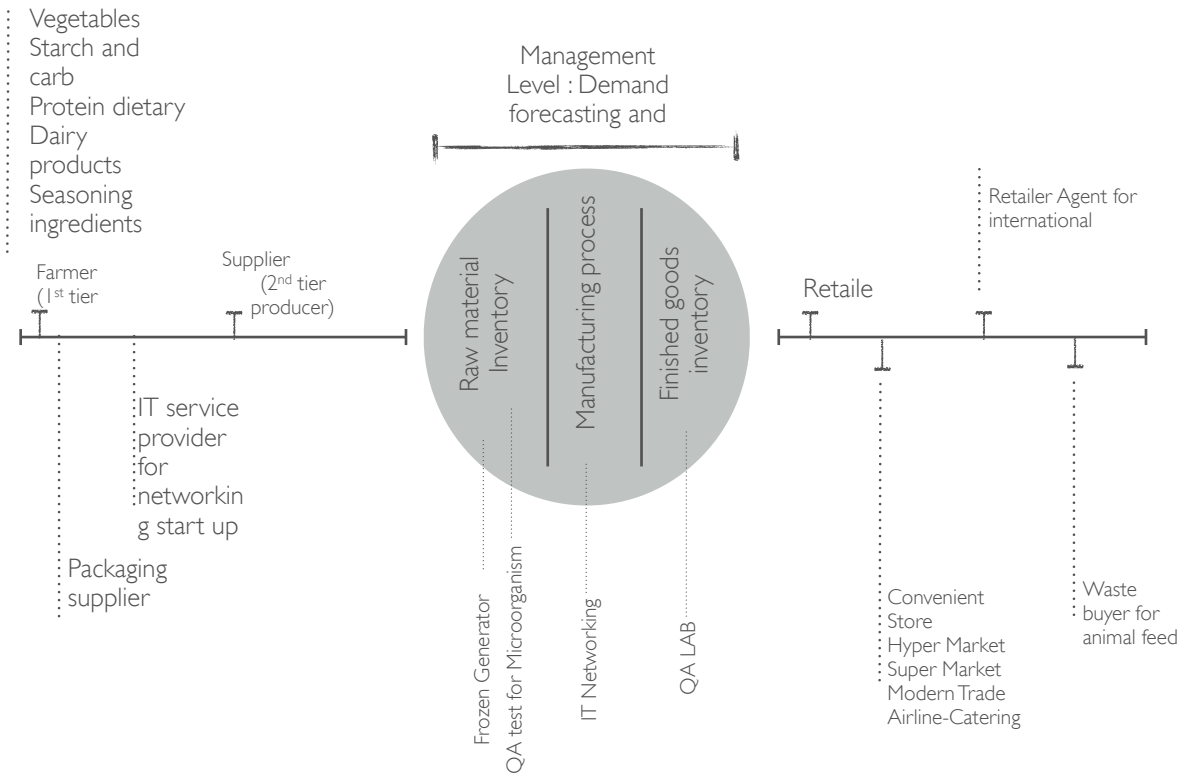


Figure 1: Overall supply chain overview of ABC company

According to *Figure 1*, the supplier that fleet raw material into ABC company's production line can be categorized into 3 main distinctive groups; fresh ingredients supplier, packaging supplier, and service provider. Most of the problems found beyond supply chain of ABC company were at upper part of the chain where many restraints remain uncontrollable due to it's organizational size.

Underpinning the problem of this research, the criteria of problem preliminary was set. The research scheme will only focus to the most impacting blockage that have greatly effect on the whole chain. From that hypothesis, it is undeniable that the major problems of up-stream supply chain network were found exactly between the company and its partners, in particular, the packaging suppliers. It would have been a burden take fully control over the fresh raw

material as there were tremendous amount of suppliers that fleet into the operational line.

Figure 2 : Supplier selection criteria

Fresh Ingredient Supplier

To control the product quality of the firms, “Contract Farming” technique should be adopted into fresh ingredients procurement, not only the quality of these fresh ingredients will be under controlled but also to ease out the fluctuated price of the raw material from the global warming effect. Unfortunately that the “Contract Farming” method cannot be applied into the current system as the firm’s size is too small that the order volume was not met the supplier’s minimum requirement.

Moreover, the remotely location of the fresh ingredient suppliers had made it more difficult to full monitor on it’s cultivated processes to assure the cultivation quality. However, producing one product does require tremendous items of fresh raw material which some of them are from locals but some are imported from overseas suppliers. Therefore, it is barely possible to adopt full transparency with overseas suppliers, in other words, with any other fresh raw material suppliers.

Packaging Supplier

To assembly one product, it requires a specific type and design of packaging; shape, contour, color, and material. There are varieties of packaging type being used along the production line which the quality was put into highest priority to be concerned. The material used of both inner and outer packaging have to be produce for food-purposed which the cost of these kind of material is higher than normal packaging.

According to *Figure 2,* the packaging cal be categorized into 2 different kinds; inner and outer. Inner packaging requires higher quality and specification than the outer one as any contaminations from microorganism can caused major fallacy to the company's reputations. Moreover, the products produce are "ready-meal" which the inner packaging must be microwave applicable as the product sold needed to be defrost and heat up through microwave. On the other hand, the out packaging (paper carton box) is acting as the outer shell of protection for the inner packaging from direct sunlight and any other contaminations through out the delivery processes.

Focusing on packaging procurement policy, the ABC company has bought different types of packaging from various suppliers regards its expertise in its field. Benefits of buying packaging raw material from various suppliers is that the company did have the opportunity to select the finest suppliers and can be switch into other suppliers if any of them cannot perform to what have been promised.

Contrarily, the variety of the packaging supplier did cone with the complexity of the procurement and relationship between the firms. To avoid the packaging uncertainty, the company have to order the packaging in larger batch size to mitigate the risks of shortage. Even though the packaging material has longer shelf life to be expire than the fresh ingredient, the design of the packaging won't last that long as the design of the inner package has to be trendy and modern to attract the key customers. Therefore, stock up high level of packaging inventory can certainly caused the company the negative effects

which the dead-stock of packaging cannot be recycled into any production line and will end up as waste. This amount of cost wasted each year can jeopardize the company's financial situation.

Cost

From *Figure 3*, obviously that more than 50% of the overall cost was laid at packaging cost. The cost of packaging is unavoidable due to the specification of the product as well as the quality. Along the production process, the product had been cooked and baked through high temperature and frozen back down to -16 degree celsius to maintain it's shelf-life to be as long as 6 months. Therefore, the inner packaging has to be durable through out such extreme range of temperature that this kind of packaging comes with higher cost than typical one.

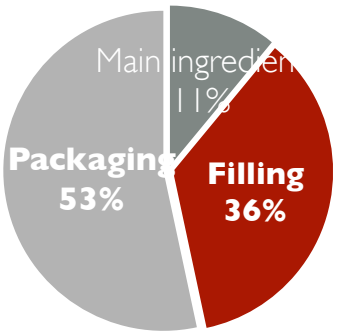


Figure 3 : Product's cost structure

Inner Packaging

Outer Packaging Sample (paper carton)

Figure 4: Samples of packaging

1.2 Problem Statement

From the problem background stated earlier above, obviously that the flow of supply chain gearing has been bonded together by tiers and layers of business partners; primary, secondary, and tertiary. Each level was tied together by basis element as ‘Trust’ which was built solely through the credibility and company’s reputations hold. In this case, the opaqueness between the procurement department of the company and the packaging suppliers seemed to be core problem that should be improved.

By its opaqueness behavior that communication between the firms was very limited and inaccessible of information. Large amount of packaging wastes clashing along the production line (scrap from mismatched color and design) were mainly came from the ambiguity of one-way communication. Altogether with the product life-span shrinkage that urged the need of packaging re-design to occur more ofter than in the past. On the other hand, the information congruence regarding the specification of the packaging design is underpinning it’s important along with the transparency behavior.

To balance the uncertainty and risk of material shortage at minimum, the firm has to procure larger amount of packaging inventory than its actual demand level. Moreover, it takes 10-14 days of delivery from supplier’s production to ABC company which this time gap is also one of the uncertainty that have to be minimized. To avoid the material shortage, exceed amount of packaging will be ordered in and stored as safety stock by which this bullwhip dilemma had caused the company with higher waste level due to the expiration of those inventory stock. Cost of waste has piled up as high as it can jeopardize the firm’s ability in investment by blocking the fund-flow and financial liquidity.

By the uncertainty that is likely to occurred, it was originated from the unreliable in performance level that from time to time they cannot performed on what have been promised. Furthermore, the suppliers hesitantly to report back to ABC company if there any problems on their production. Once the problems

found, it was too late for any alteration of production plan of the ABC company already which larger amount of packaging raw material would piled up in stock for next order.

This was led ‘Distrust’ to be formed along the relationship between customer and suppliers. It is better to avoid these problems by implementing information sharing activity to transfer opaqueness of both organization into some what transparent behavior. To the extent of transparency behavior, the characteristic of transparency will be exposed through convergence of information flow in and out of ABC company to the suppliers.

Besides, the transactional waste from the mismatched packaging specification can be decrease through addressing the transparency scheme. It is necessity to response and avoid those uncertainties and bullwhip demand by sharing more relevance information often. Shared information should based on selective and justified manner which believed to be led to collaborative ability of both firms.

1.3 Objective Of The Research

This research’s objective is to identify possibility of embedding transparency concept into up-stream supply chain of the SME size entrepreneur in frozen food industry as well as to propose the optimum transparency framework to foresee the opportunity of achieving mutual collaborations and other business benefits.

1.4 Research Scope And Assumption

The scope of this research is to identify the possibility of implementing the transparency concept into the current supply chain procedure whether it should or should not be embedded. The transparency concept through the information sharing scheme was set to be grafted only in the up-stream supply chain components, between the ABC company and the packaging suppliers to be

exacted. This research aim to understand more on the consequences of embarking the information sharing activities into play for strengthening the way of communication and strategic partnership.

Regarding the subjectivity of the transparency concept, there are diverse perspective and levels of adopting transparency, in this research, the transparency scheme was contoured down to be at one dimension: information sharing. Up-stream supply chain component was selected to be performed the information sharing activity as it was believed that the easier access to information can increase the production efficiency while reducing the cost through waste reduction.

Therefore, it is necessity to identify area of improvement of the current system used and embedded the alteration framework onto the current one. This alteration of current work procedure will be put into real practice which possibility in adopting transparency concept in such small scale enterprise will be justified through both qualitative and quantitative research manner. However, major limitation of this research relied greatly on funding restraints of both ABC company and the suppliers that both of them have very limited ability to invest in such technology platform. As a result, the proposed transparency framework will be customized to fit in with given funding constraints and other limitations.

The study endeavors to achieve the most optimum resolution of undertaking the transparency scheme and trigger the win-win business situation to be occurred. Thus, the learning processes accrued from this study can be used and leveraged by executive levels in improving the decision making processes of the procurement scheme.

1.5 Expected Benefits

Long-term Relationship Established : Through the transparency framework and information practice that will be put into play, it was believed that the better communication that is 2-way and full of compassionate will nurture trust to be occurred. Once trust was built along the relationship between firms, the longer relationship will also can be established, strategically. By the suggested framework itself, it required “Top-Down” policy from executive levels down to shop-floor level to implement this approach which it is possible to do so due to good personal relationship between the executives of the two. There is potential to nurture the long-term relationship through more openness way of communication that allow both party to be a part of each other.

Better Management Of Uncertainty : According to the shrinkage product life-span and time-to-market from design process to launch may takes up to 6 months long, the transparency framework through information sharing practice will improve the communication between suppliers and the firms. The improvement of communication and quality of information shared will give the win-win situation for both parties to achieve better uncertainty management. The information sharing practice was believed to help decrease the waste level (waste occurred from re-work and scrap that packaging was mismatched). Moreover, it can also help reduce the inventory brought in from the effect of both bullwhip demand and mitigate the risk of packaging shortage from the under-specification packaging order that had been sent from the supplier.

Waste : It was expected that the transparency concept will improve the communication accuracy through the data sharing scheme. To be precise, the communication between the firm’s design team and the packaging suppliers will be improved through the information in the extent to reduce the scrap rate. As it was found that most of the packaging scraps were mainly came from the

mismatch idea and opaqueness of the communication in this stage of design. Therefore, the more frequent of data sharing with relevant information shared should improve the waste level with both ends.

1.6 Research Methodology

The research will be conducted through both quantitative and qualitative method to reveal both tangible and intangible perspective of the results obtain. The first phase of the research is to explore all the requirements and constraints of the problem stated. As-Is analysis will be conducted to identify the possible area to implement the transparency framework and information sharing practice under those given conditions. Follow by the second step, the implementation process of the suggested framework, the framework embedded in this research was re-design by adopting the information sharing technique which mimic and customized from world-class corporate's practice to be most fit to such small-scale enterprise.

The quantitative investigation will be measured through waste level on the same basis of design change pace, cost of waste that expected to be reduced through the model suggested, and the level of inventory brought-in. On the other hand, the qualitative manner will be conducted through online-formed of questionnaires to explore the intangible findings; satisfaction, commitment, and other emotional-attached issue. These questionnaires were designed to reveal the employees' perception towards the new transparency framework grafted whether the incentive alignment and compensation are at adequate or not.

	2011		2012				2013			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Collections of data - Current problem of supply chain analysis - Research scope criteria set-up - Supplier selection processes - Potential method exploration - Expected benefits and results of potential method selected	●	●	●							
Literature reviews - Supply chain theories - Transparency supply chain theory - Information sharing technique - Advantage of mutual collaboration and its importance in the present world - Transactional cost economic theory - How to nurture trust among partnership			●	●	●					

	2011		2012				2013			
Research methodology - Overall study regard Thai SMEs - ABC company's AS-IS study - Supplier's AS-IS study - Design of methodology - Identify area of improvement of the current framework - Implementation processes			●	●	●	●	●			
Data analyzation - Quantitative : Waste level, Cost, and Inventory brought-in - Qualitative : work satisfaction questionnaires via on-line form						●	●	●		
Conclusion and Discussion - Comparative view between the old system to the new one						●	●	●		
Report preparation and final dissertation exam									●	

CHAPTER II
LITERATURE REVIEWS

Theories and academic findings are compulsory for this research as the transparency concept has enclosed tightly within the research's objective. Transparency itself has recently gain its attention from both academic study and real-world industry where many techniques of information sharing were adopted. Theories adopted in this research were intended to impose how information sharing can lead an organization to transparently manage it's supply chain reticulum while keep good relation among business partner. Study on how the others adopting such technique will provide more vivid illustration towards the process alteration design. Unfortunately, it was hardly found such small scale enterprise embarking with transparency concept in reality, therefore it is necessity to understand more on involved theories in order to design and implement such system into practice.

2.1 What is supply chain and transparency scheme

The concepts of supply chain has been developed since the 80s while the globalization of the market has been triggered (R. Narwal & J. H. Dunning 2000). The globalization had provoked the volatility of the market to rise higher with the rocketed demands. Moreover, the fluctuated of the demand had urged the need of speed that the manufacturing entrepreneur and operational floor have to adapt its sail quick enough to strive through shifting demand tide.

In the past, the quality was the heart of the product that every entrepreneurs put to highest priority. Unfortunately that the trend kept changing and became more challenging. Now, only the quality was not enough to hold market leader position any more. In this new era, the need of speed is necessity that urged the importance of jointly innovation through the whole supply chain gearing to be the new key to conquer the market share. The influential of speed

has tailgated since the industrial revolution roused the product life span to be shrank while the quality of product is still fundamental and required. The shrinkage of the product life cycle means that the company have to improve its product's quality to be better at faster speed as there will be more and more new players emerge into the market.

By the technology advancement, globalization, and economic bubbles that accelerate the pace of market development to be cost-oriented and aggressively competitive, the supply chain distribution has been totally shifted by those dilemmas (Z. Yu et al. 2001). The change has triggered not only the redesign of the manufacturing process but also to merge with the new business partner from other parts of the world through the globalization trend.

The current market is now full of volatility and fluctuation which bring changes as well as challenges that the company has to strive through (Sull D. 2009). Now, it is vital for the company to have the ability to capture and leverage from the changes and response to them quick and smart enough to shift the situation around and become the market survivor. Moreover, reacting to the change is might not enough, it is also important to strategically plan for the other alternatives through the turbulent time. In addition, strengthening the strategic policy is also necessary as well as to react accordingly to those plan in order to resume the business structure. In other words, these abilities are called "agility" and "adsorption" by which they are now keys to thriving along the strong tide of the market change.

Focusing on the realm of business model, agility can be grafted into many perspectives to capture the opportunity just quicker than the opponents while response directly to pull back the resource off the uncertainty business subsidiaries. Consequently, it is required an extremely strong financial balance and good governance altogether which these two strong components will help export the opportunity from those swiftly changes.

In arguably (Grief M. 1989) had strongly suggested that being agile is not enough to push the firm towards its goal any more. He suggested that encouraging everyone to participate is as well important. Contradictory, the manufacturing plant relied greatly on the labour in which the communication thoroughly passed along the shop-floor up to the management level is one-way communication which is full of mutual distrust. Perhaps, the visual technique can solve these communication agendas in order to represent the transparency through the shared information rather than kept it only with fews managers.

In reality, transparency concept was not any radical revolutionary, many corporates has leveraged the advancement of technology to put transparency into play. Transparency in supply chain context can be referred to many elements that was built into specific relationship (R.C. Lamming 2001). The transparency concept was developed from the “Lean” paradigm that many break-through working techniques was deployed; wasteful activity elimination, reduction of idle time. The objective of being “Lean” was to eliminate those additional cost and time that lessen the process efficiency of the firm. In contrary, agility of the production process were one of the elements that was formed which agile manufacturing required high inventory level in responding to the dynamic market demand. However, higher amount of inventory was detract the system out of leanness path.

Later on, those paradigm of agile and lean were developed into cost-transparency in the mid 90’s where the concept was about removing parts of the system out rather than created the new mechanism (R.C Lamming 2001). Through the burst of wireless technology, the transparency has become more practical by leveraging the information sharing technique. The communication was underlying upon the concept by pools of data.

Despite the fact that transforming the opaqueness of the process into more transparent stage is very challenging task which required full effort on collaboration from all counterparts. The transparency approach, in other words, is

a holistic schema that aimed to integrate into every stages and perspectives of the chain. Selecting the right measurement and indicator of the altering process is also important issue as to which the indicator will detect any malfunctions through out the progress embedded as well as to keep track of every path going be the new sets of working rules.

Another key anecdote to the path of transparency is trust, (B. Rawlins) had suggested that transparency is somehow related closely to the firm's ability to share it's information. The more information shared, the more likely of trust gain as well as the more transparent the firm will be. That is to say, trust is the initiative to transparency, trustworthiness of the firm encourage the more transparent communication and enabler to the mutual benefits.

Information shared through the advancement of technology relied greatly on trust, committing to each other to share responsibly. Another way around, trustworthiness can be built from strictly uncompromising of self-analysis ability which will help the firm gaining its reputation. Unfortunately, it is also exceptionally difficult to measure trust and transparency as they are intangible through multi-dimension issues. According to (B. Rawlins), Transparency concept can be embedded into many levels of commitments as informational, participatory, and accountability. These levels of transparency accounted for the trustworthiness of the firm.

Consequently, not any corporate can thoroughly adopt the transparency concept, to adopting this approach must procured full picture of supply chain system and good "Top-Down" policy to convince the supplier/customers to follow the same direction. In traditional way of supplier negotiation, open-book technique was often used which the technique's objective was pure cost reduction. This open-book technique requires superior knowledge of both process and product to be succeed in negotiation. However, the major weak point of such traditional technique was the risks were left on supplier without any

compensation. This technique was not support the long-term relationship as the supplier has to survive and response to those demand uncertainty by its own.

As a result, the transparency concept has been developed through that dilemma aiming to be responsive for market's pressure while keeping the good relationship among suppliers. Transparency concept through the information sharing can contribute to built stronger relationship between business partner by which cost-reduction still laid at it's heart as well as to reduce the idle time. The dynamic of transparency was driven by the goal congruence between partners which the technique can be either permanent or only for short-term action (R.C. Lamming 2001).

In other supply chain dimensions, there are tremendous techniques to enhance the supply chain's performance, one of them is forecasting which was strongly believed that any forecast conducted cannot be a 100% accurate. (C. Emi & Z. Qingyu 2010) once said that "forecast is just a forecast", however, most of the firms did rely on too much . The purpose of the forecast was only to inquire the right information that will be needed for supporting the decision making over a certain action took regarding the fluctuating future. A well conducted forecast has to be based on the full understanding of the processes of logic that directly affecting the quality of the results.

Over rely to any strong opinion can massively invaded the company into the wrong tide of the aggressive market (C. Emi & Z. Qingyu 2010), therefore, the firm should loosely hold onto those strong opinions and interrogate to whatever premises often dominate. The loosely hold of any opinions will allow the firm to response wisely to the contradictory outcomes as well as enabler to understand more on the likeliness of the unforeseen future. In arguably, it is important to know when is not to forecast as in some certain circumstance it is too volatile and the uncertainty is so vigorous that any well conducted forecast is just rubbish.

2.2 Information sharing through supply chain practice

Improving supply chain performance can be done through many levels and degree of operation (H. Zhou & W.C. Benton Jr. 2007), for example; supply chain planning and demand forecasting, JIT (Just In Time) technique, and delivery practices. Through the supply chain planning and forecasting method, these schemes coordinate the supply chain functions in extent to better clarity of the future forecast as well as the information sharing. Another might have argued that the JIT techniques; pull system, agile manufacturing, and lead-time reduction can also push the supply chain performance to meet the unlimited demand of the customer in the more precise and timely-manner than any other practices. However, the lead-time reduction technique can only be implement and have a greater value only in the smaller batch size. The agile manufacturing technique is also one of the proactive practices that allows the system to effectively handle with the rapid change of demand which can overall improve the supply chain performance. Moreover, the bottleneck-removal scheme helps balance the resource hold as well as to maximize the production output which will improve the responsiveness and efficiency of the supply chain.

Emphasizing on the information sharing scheme, it is strongly suggested that information sharing can enable the firm to achieve higher levels of performance of the supply chain practices. The degree of information sharing is varied in parallel to the firm’s supply chain dynamic including the quality of the information, content shared, accuracy of shared information, frequency of the information sharing. It has been proved that the information quality is very determinate factor judging the information shared is useable or uselessness. In summary, the validity of the information sharing system is only when the shared information is with high quality, accessible, accurate, and relevant (Zhou H. & W. Benton jr. 2007).

Through the sharing information initiatives, the technique suggested is aimed to improve the overall supply chain practice by enhance the supply chain

planning as well as strengthening the relationship with the customers. To the quest of bettering the supply chain planning, the IT interface will definitely enable the information sharing system into higher level, according to Dell's information sharing framework (Dell is a world-class corporate which sales personal computers and notebook) that it shares its inventory levels as well as the exact customer's demand to it's business partner aiming to improve the supply chain planning. The information shared had shifted the process into pull system which allow the clarity of the supply chain planning capability to be enhanced with lesser lead-time and better customer service. In other words, the information sharing allows the supply chain to act more responsive.

Information sharing ability is formed through any supply chain partner either up or down stream of the chain by which the two strive towards the goal of achieving specific benefits and meet the business objective **(**Z. Yu et al. 2001). Underpinning the importance of information sharing method, this approach can reduce the uncertainty occurred along the manufacturing manner. The production uncertainties are mostly occurred as the effects of supply chain performances; delayed deliveries, machine breakdown, and order fluctuations. Therefore, the excess safety-stock seems to be the solution eradicating any false alarm. The higher safety-stock leads the firm to cope with higher logistic cost as well as improper usage of the inventories hold.

These demand error and variability affects from up to down stream, called "bullwhip effect". The bullwhip effect falsely counterfeit the production and sales through demand forecasting, order batching, and price fluctuation (S. Disney 2003). It seems that information sharing technique would be the most promising solution to reduce the effect as well as the uncertainty. Another solution to mitigate the bullwhip effect is to decentralized the process of decision making. Decentralization will allow each section to have it's own decision right to control over it's territory under the optimum cost and benefit. In contrary, decentralization might not lead the whole system to achieve the optimum performance which will

eventually break down the supply chain taxonomy. Yet, with the information sharing ability, it will be easier for each member along the supply chain to achieve the optimum performance if it shares and treats the others as strategic partners.

Considering the theory of strategic partner, the method can ease out most of the uncertainties by sharing some specific information among each member. Through the information being shared, in other words, it is one way to decentralized the supply chain gearing under the centralized control aiming to achieve the optimum performance and cost (Z. Yu et al. 2001).

2.3 Supply chain mutual collaboration and its advantages

Supply chain collaborative advantage has gained its popularity since most of the corporate firms had aimed for higher efficiency and dynamic of the scheme in the past decades. The reaction responses to those fluctuations of the market demand is to seize any opportunities via the collaborations with its supply chain partners. In addition, this technique has also manifested by many well-known world-class corporates, e.g. Hewlett-Packard, IBM, Dell, Procter and Gamble which the collaborative through supply chain partner was considered long-term relationship built up between the firms and their suppliers.

Precisely, supply chain collaboration is occurred when two or more firms worked jointly together through their supply chain and other business tasks in order to achieve or share some certain type of benefits and risks (C. Emi & Z. Qingyu 2010). Moreover, it was also proved that not only the benefits that have been shared, but also other resources that could resolved the cost reduction and to spark up the productivity and performance levels. Evidently, it was also proved that many corporates had fail to achieve the collaborative advantage by neither the firm itself nor it’s partner can exceed its partner’s expectation upon agreement dealt.

The barriers that blocked the supply chain collaboration to the short-fall are obviously the integration and the miscommunication issues which lucidly led both ends to conflicts and disagreements. Both partner's end of the method integrations were bonded together with the medium called "communication"; two-way, multilevel contacts, and message services.

In other words, supply chain collaboration is really related to the "hybrid governance" right from it's integration processes which overlapped with other business contracts with partners. It was firmly believed that supply chain collaboration is not about the transaction but rather "pure utilization" of the information sharing along the firms (C. Emi & Z. Qingyu 2010). These seamlessly joint of innovation and accessibility of the information technology can definitely perpetuate to achieve the competitive advantage.

The paradigm of the strategic alliance is basically based upon the reticulum of relationship between each independent inter-organization of the supply chain gearing. This specific type of relationship can help the firm to harvest those perquisite over the competitors in a certain type of market. To be exacted, the synergic advantages cannot be leveraged from an independent business intercourse alone, but with partner's collaborations. The key to achieve these mutual benefits are the synchronization of the business activities conspired; information sharing, accessibility of resource sharing, risk splitting, and cost inducement. These incentives gained from mutual collaborations are truly accepted that it can absolutely escalated the profitability to be higher that the solitary action can provoke.

It also pointed out that supply chain collaboration was not exchanging the true value between each other but rather entailing the inauguration of the new value together (C. Mei & Z. Qingyu 2010). To generating the new value, the firm must deeply focuses on the relationship connections and the infrastructure of the relationship among each alliance to leverage the possibility through the unforeseen market options. These collaborations are also fostered the learning

processes along the operational scheme which is clearly stated that the resource trend is shifting downward as there will be many players entering the market.

Therefore, the scarce resource and soared price of material were hindered the ability to capture the market competitive advantage. The unique characteristic of the supply chain collaboration can recede these barriers by simply fulfilling the capacity and improving the performance. In addition, the higher capacity generated from adopting the supply chain collaboration technique can also lead the whole chain to the best practices; clear-cut decision making, cost saving through resource sharing, and innovative idea from business binding augmentation.

Process efficiency *– There is concrete evidence determined that supply chain collaboration can increase process efficiency as a whole by formulate the cost-competitive manners beyond the first tier and its counterpart. Being cost-competitive can be achieved by various approaches; disclosure of data, IT infrastructure, seamless logistic processing. Moreover, improving the overall process efficiency can indicate how well the firms perform on their management execution through inventory turnover and balancing of the operating cost. In other words, process efficiency might referred to profitability generated by way of smoothness between business processes.*

Flexibility *– The approach to supply chain collaboration imposed the corporate to agility in its supply chain process: market responsive. Market responsiveness is the ability to adapt according to the change of the market's demand by leverage the convenience of technology to share one's information to another swiftly. The volatility of the demand required faster move of product modification as well as more precise decision-making.*

Business synergy *– The synchronization of the firms congregated to work jointly together aiming to achieve the supply chain collaboration mutual advantage. Sharing resource is one of the techniques that drives the corporate to profit enhancement through the improvement of resource utilization. Resource should be utilized to maximum, not only the tangible resource but also the intangible one, e.g. skills and employees competencies. This mutual decision making upon resource utilization can accumulate the value-added into the profitability.*

Quality *– Despite the fact that quality is the heart of every products that is the order-of-winner for customer, however, the product quality alone cannot fulfill the needs of the customer anymore. There are sub-dimension of quality including agility, product design, and after-sale service that lead the company to the loyalty and steal the market share from the opponents. Consequently, it is obviously that quality can be build from supply chain collaboration.*

Innovation *– In the need of speed as in the globalization era, the firms need to create new product serving the endless needs of customer more often. The shorter of product life cycle accelerate the need of innovative products to be launched quicker regarded to the economy of scale. Therefore, the relationship between the firm and its suppliers have to be tightly bonded.*

Firm performance *– The burst of supply chain collaboration had urged the improvement of the firm's overall performance by which physically measured through many financial index; return on investment, profit margin, and sales growth. These index reflect the firm's ability to perform its business's motto to fulfill it's customer's needs. In other words, supply chain collaboration can be roughly measured through these financial terms only if the collaboration really rooted beyond the firm and its suppliers*.

2.4 Supply chain trust (S. E. Fawcett et al. 2012)

The collaborative relations were built upon the complex function of “trust”. There are tremendous evidences proving that trust is concretely required for creating the last-long relationship between each end of supply chain strategic partners. It is also stated that trust is built from two core-dimensions; benevolence and capability. Benevolence means kindly generosity, while capability means the ability of doing things, therefore, trust might involved the ability to perform in order to exceed other’s expectation while still being compassionate.

Regardless of intentions and skills, trust could not be built as it has required the capability “to perform on what was promised”, by the nature of market’s competitiveness that forced the firm not to work on it’s own but rather triggered the urge of of mutual collaborations. Underpinning the importance of suppliers’ commitment to perform flawlessly, expertise and core-competency really are necessitated. In contrary, the over-desired can caused the false promise by the supplier that ever wanted to win the work contract badly that they cannot delivered what was pledge, in this case, distrust and other task failures are likely to be occurred.

Building trust is a time-based process through relationship regarding the firm’s performance and commitment capability, trust can be traced back to the firm’s vision and business policy was aligned. The wrong concept of incentives can simply paralyzed the whole organization which the evidence was proved by many companies were only focused only on the short-term costs that they were trying to minimize while completely neglecting the long-term cost that was actually soared.

The incentives between those short-term cost and the firm’s performance level can be jeopardized by the trade-off behavior of the business manners as most of the management levels tended to focus on cutting the cost to be at minimum and disregard to the fact that the cost might have increased over the

long-term run. Being focus only on the price will eventually disrupted the relationship building processes as each side of partner will demand for the lowest price without “benevolence” for another’s partner situation. In other words, cost-driven perspective can simply drawback the relationship and ability to build trust along the supply chain especially in the upper-stream supply chain.

Moreover, the mismatched concept of incentives had inclined the undesirable behaviors by which the premise to trust building was blocked as well as lessen the longer term performance. Therefore, trust does require high levels of commitment through employees’ skills, leadership of the management levels, and the matching incentive concepts. From the literature findings, it is clearly stated that the many corporates have been trapped into the outdated way of management which bluntly hindered the organization to perform smoothly through it’s supply chain. That is to say, it is merely impossible to win the bet of doing business the old way without committing any trust beyond it’s partners.

Besides the fact that technology can help cutting the cost, technology is also one of the issue to block out trust. Wrong concept of technology usage can caused the reversed effect by building the skeptical atmosphere which can agitate to the future collaborations. Another catalyst that boost up the collaborative trust is the firm’s ability to commit, willingness to share the information, openness, and capability to perform are needed. These basic characteristic are the premise to push the firm across the expectation from it’s partners.

To achieve the more resonance of the long-term relationship, both partner side have to be supportive for each other regardless of the cost. Through the long-term relationship, the cost alone could have not resolved the compassion to collaborative trust. Yet, robust strategic partner’s ability to support each other can be considered as “buffer” as opposed to those of any sudden market appetite. Being responsive to the fluctuation of the market demand is necessitated that

strong relationship between the firms and it's partner can play much more important role by sharing both risks and benefits together.

2.5 4-levels of trust *(*S.E Fawcett et al., 2012)

Embedding trust into supply chain relationship is required great endeavor regarding the fact that each supply chain components and relationships are unique. These uniqueness brings about the different levels of commitment as well as investment capital means. However, the uniqueness of capability of the relationship built can be merely imitated since measuring trust is very difficult. The trust initiative factors should be inaugurated from within through employee's skill sets that matched with job satisfaction and motivation.

Trust-building initiatives :

1. Spontaneously growth possibility
2. Ability to exceed what have been expected
3. Financially promising (profitable)

It was believed that time is irrelevant to initiate trust but rather iterative experience and pure desire, in some cases, trust are built by either commodity-oriented or cost-driven cluster which is irrespective of time. Underpinning the importance of market responsiveness which was requisite which being agile is the key to seize the first-mover advantage from the swiftly change of the market demand. The collaboratively joint between the firm and it's partner can help initiate the trust to be formed as well as increasing the market responsiveness.

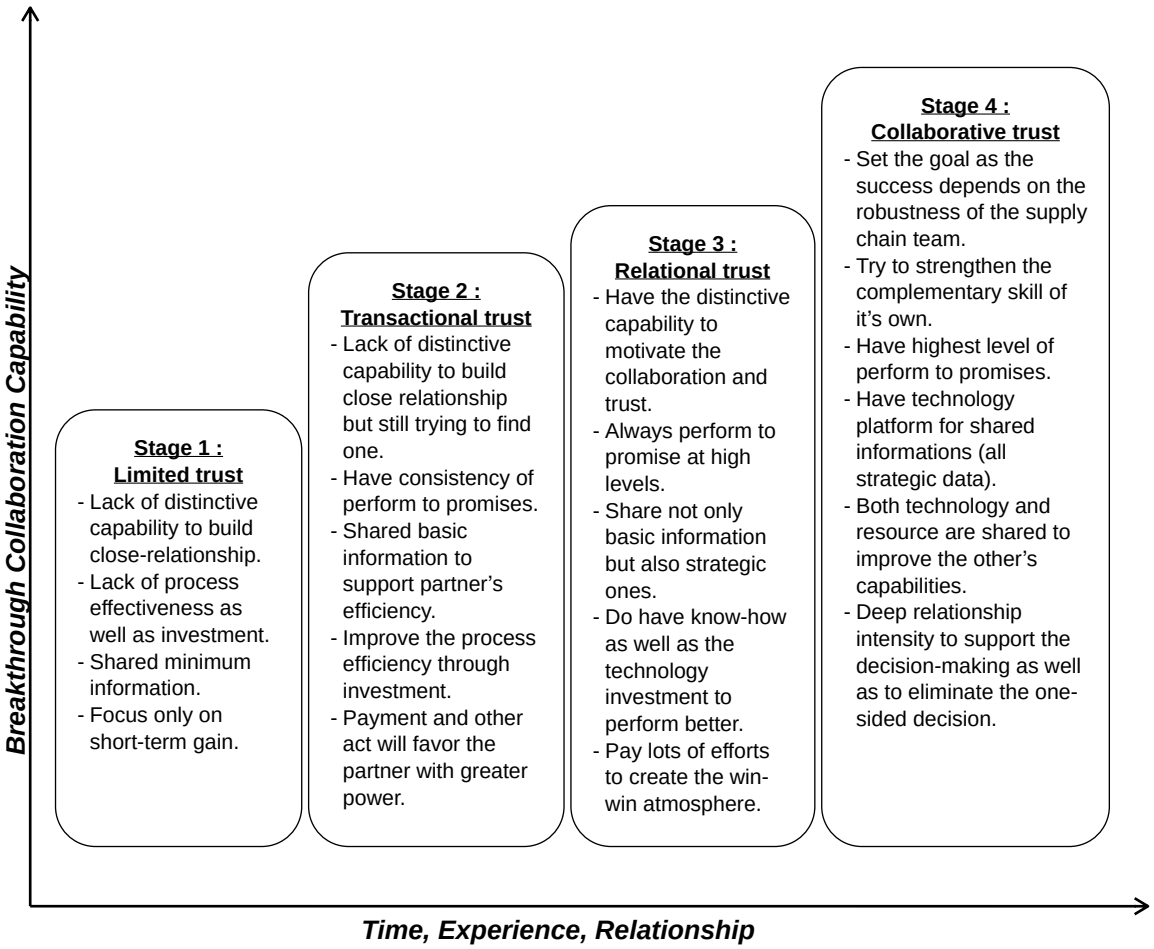


Figure 5 : Trust maturity framework
SOURCE : (S.E. Fawcett et al. 2012) Supply chain trust : The

a. **Limited trust [Level 1]** – The lowest level of trust which short-term cost was the only issue that is focused. It was found that only certain levels of quality is needed. Therefore, tough negotiation and other deceitful tactics were found along the pursue of cost-cutting which affecting directly to trust assembly processes and the long-term relationship.

b. **Transactional trust [Level 2]** – The more intense level of trust was emerging through higher levels of performance and work efficiency. This emerging stage of trust assembly is formed by the firm's

willingness to achieve higher success. Beyond this level, technology does play a great role that it can enable the firm to the information accessibility, in other words; transparency. However, transactional trust stage still depends on the economic conditions which economic recession can drop down the sales volume as well as slow down the production volume which eventually trust might have been terminated.

c. **Relational trust [Level 3]** – The relational trust was made from two pure unique business partners which perfectly matched to each other. This stage of trust is time-dependent which trust was built through both shared risks and benefits. In this stage, compliment is very important to ensure and intensify the other that one is trustworthy for one another to rely on. Relational trust is a strategic weapon that can broaden the opportunity in investment while growing the relationship and productivity. In addition, the distinctive characteristic of the relational trust is the empathetic flair that ultimately mellow the relationship through interpersonal skills as well as self's sacrifice of the employees.

d. **Collaborative trust [Level 4]** – By this stage, it is the most intense echelon of collaborative trust which was built through conventional dogma; shared resources, improved process efficiency, and also shared some beliefs. Collaborative trust is clustered from all the supply chain gears that rolled perfectly together. The core of collaborative trust is laid beyond the information sharing capability which the more information were shared can be implied to the degree of trust built.

2.6 How World-Class Corporates Deploy the Transparency Scheme and Information Sharing.

Corporate	HOW
Honda	- Resource sharing to maintain the quality of the final product. - HONDA elites engineers were sent out the suppliers' site aiming to seamlessly collaborate the supplier to improve the quality as well as to shorten the lead-time and cost reduction. - Gain trust from supplier by those resource and data sharing provided with intimately long-term relationship.
Procter & Gamble	- Information sharing scheme was adopted through advance technology platform that allows the supplier easier access to raw-data. - Large amount of investment were put at technology development where the system smoothness came from.
Walmart	- "Open-Door" policy that allows supplier to survey the buyer's behavior as well as the technology platform for easier access of demand. - Trust was gain through the capability of those initiatives elements stated above.

These three examples of trust-innovation (S.E. Fawcett et al. 2012) verified that strategic supply chain alliance is necessity regarding the market agility of global competitors. Moreover, it is proving that collaborative trust can plunge the profit growth as well as enhancing the process efficiency. Unfortunately, such innovation which relied greatly on trust is very difficult to imitate. High levels of trust needs such a convoluted levels of relationship and financially investment. Some are trying to graft this technique but sadly fail the process as they took on trust-building only on the surface without deeply understand of it's nuanced behavior of trust.

2.7 Risks and benefits of trust (S.E. Fawcett et al. 2012)

As stated above, the quest to achieving mutual collaborative is costly, according to S.E. Fawcett et al., building trust is a difficult task that it required both financially and physically investments. In terms of risk, mutual collaborative initiative and trust building are considered risky issue. The risk laid beyond the chance of misconceiving it's core competency and true value. It would have been lethal in terms of business if the firm leave it's true value unlocked. Risks and trust are inversely variated by its nature, the better performance can lower the risk while increasing trust. This true dictum legitimates the chances of increasing collaborative as well as financial alacrity.

To expand the opportunity in collaborations, openness is the key to enabler collaborations into other perspectives than the supply chain psyche. Such innovative collaboration can open other windows to meet the endless demand of the customers which cannot be imitated over short amount of time but only pure commitment and trust. In addition, there are many corporates that exposed with risk-avoidance behavior which will hindered the relationship by impeding trust to be very limited. Along the trust assembly process, any risks should be identifies that the right monitor and evaluation method should take their part along the process to assure that the investment will not fail poorly.

2.8 Transactional cost economics theory

The theory of transactional cost economics was used to explain about the relationship of how a firm used hierarchies and market mechanism organizing it's business structure (C. Mei & Z. Qingyu 2010). The concept of transactional cost was emerged into the supply chain collaboration apparatus aiming to reduce the cost that is acceded to market transaction. However, this concept requires both process integration and mutual trust to spot the cost that might be fallen along the business deal.

Resource base view theory – The theory of "resource base view" is referred to explain the nature of supply chain collaboration by which the concept of "Resource Base View" consisted of resources, capabilities, and strategic assets (C. Mei & Z. Qingyu 2010). Focusing only on the resource, it was acclaimed that any corporate who can exploit its resource efficiently will eventually gain the competitive advantage. However, if the firm cannot leverage those limited resource to the fullest through it's own capability, it might have lost the market advantage. Through the resource base view, the firm is enable to seize the competitive advantage from it's own investment on preferred assets. Such uniqueness in specific resources allow the firm to focused only on the real core competency as well as impeding the competitor to imitate it's technique.

Relational view theory – Relational view theory is the complementary version of the resource base view as it explained the concept that the firm can comprise over to other divide as the profit was generated from the jointly through the collaboration mechanism (C. Mei & Z. Qingyu 2010). Let alone the firm cannot be granted with critical resources but the partner contribution's. The shared resources and assets can be the breakthrough innovation that help complement the success and profitability of both the firm and it's compeer.

CHAPTER III
METHODOLOGY

This chapter will generally guide each step of preliminary study conducted to explain of how transparency concept will be designed and grafted into the current system. The transparency concept design was derived from the case study and theories consideration in the previous chapter, which the combination of both academic and real-world practice was superimposed into the new transparency framework proposed in this research. The measurement criteria and data gathering methods will followed closely to quantitative and qualitative research manner in accrue as concrete results as possible.

The motivation that drives this research towards transparency scheme was mainly came from the willingness to improve the overall process efficiency of both firms to create win-win business situation with most modest approach. As stated earlier, to adopt full-transparent mechanism of the supply chain, it requires large amount of investment capitol and full negotiation power which not every firms can simply applied for. However, the benefit of transparently manage the supply chain is as alluring as the firm can achieve better process efficiency as well as maintain good relationship with suppliers (S.E. Fawcett et al. 2012)

To answer those research's dilemmas, an extreme internal study will be conducted as the first preliminary process whether the firm has the ability to adopt the transparency concept or not. The subjects included in this internal study are; the firm's financial ability, current procurement processes analysis, and other restraints. In parallel, the external research is also essential as the transparency framework should identify the win-win yield that both firms will get from adopting such technique. In addition, both internal and external study will

identify the area of improvement where the transparency framework will be put at.

Unfortunately that funding restraints of grafting the full coverage of transparency scheme as renowned corporate is immoderately to SMEs scale, yet, there is still an opportunity for SMEs to adopt some elements of the transparency scheme into it's business manner. Consequently, the transparency framework has to be contoured down and tailored to applicable with economic of scale and to fit with its own uniqueness of the specific relationship and working cultures.

3.1 PHASE I : As-Is study (internally and externally)

3.1.1 Nature and Characteristic of Thai SME (industry overview)

In the present, Small and Medium Enterprises have been taken their spot as critical players in the world's market place (Purchase and Thing 2004) that has contributed so much to the export sector as well as job employment in the labour market. In particular, SMEs in Thailand have contributed to almost 50% of the overall gross domestic product (GDP) through import and export markets. These SMEs seemed to be grown nationwide by the eruption of the technology advancement under the globalization. It is claimed that Thai's SMEs are grown together with the country's economic structures; cheap labour cost, cheap handling and storage cost. However, those factors are being ousted by the fact that Thai's labor cost is driving higher by it's government's policy as well as the cheaper labour cost in the neighbor countries such as Myanmar and Vietnam. Accordingly, Thailand is now struggling to push itself as a critical exporter by trying to be the hub of transportation through it's strategic location that is located at the center of South East Asian and it's infrastructure advantage.

According to the Royal Thai Ministry of Industry, SME means any enterprise that required equal or not more than 50 employees and hold fixed assets not to exceed 50 millions Thai Baht will be considered an SME. However, the numbers can be varied through the different business sectors; manufacturing, service provider, retailer, and wholesaler. Reinforcing the immense power of the SME is where most of the Thai's economic laid onto by which the overall export ability are literally came from SMEs. By those huge numbers contributed and the numbers of employment provided from the SMEs sphere, it cannot be denied that SME is really the main gear that drive country's economic system these days.

The most distinctive characteristic of Thai's SMEs is their "leanness" structure which more than 90% are family-run business, in other words, "proprietorship". These family-run venture are mostly incapable of financial management which eventually led them into financial-oriented drawbacks. Underpinning the importance of the financial obstacles, the limited access to the capital input can be a major problem that bring about other difficulties in securing the credit line from financial institutions. In consequence, this will soon encounter those SMEs to lost their cost benefit by the rising input cost through the undulated currency exchange and supply constraints.

The way SMEs accessed to the source of fund was through the credit bureau or other financial institute credit systems. Credibility is really the nucleus of the SMEs that most of them are relied onto. In the case that the owner of the business start-up with privilege and wealth, along with high levels of entrepreneurship skill will likely to have less risks upon those credits loan. It is also believed that these type of ownership will smartly invent to the balance of the invested capital and the interest rate of the loan. Unfortunately that this kind of entrepreneur is account for only few numbers by which the rest are with limited regarding many other constraints and challenges.

The challenges of proprietorship SMEs are that they are lack of entrepreneurship, lack of technology support platform, insufficient research and development upon their products and expertise, low quality standard and unreliable inspection system. The insufficient technology support have made it is very difficult to acquiring the basic compulsory information needed in the export strategic planning scheme. These internal drawbacks are submerging Thai's SMEs into the performance downfall.

As being known, SME is the backbone of the country's economic matrix which the government is being support and assist in whatever ways to push SMEs into bigger step. Striving into higher competitive export market, Thai's SMEs have to improve their own resources to be able to compete in the international arena. To grow sustainably, being the cost-leader will not be enough to be the market winner but holistically the improved product's quality, firms' reputation, know-how and skill-sets of the labour, physical technology, and market capability can help the SMEs to sustain their growth.

3.1.2 An Overview of Thai Working Habits

Thai working culture has a very distinctive characteristic of its own by which the stigma of working in '*Thai-Style*' may not be the advantage for competing in the international market. In particular, based on the research from the ministry of culture has confirmed that Thai workers reflected his or her perception towards work is only for economically returns such as money compensation rather than appreciating the value of the job itself (S. Ideta 2007). Unfortunately that there was no recipient had claimed that they will work for representing their own skills or achievement. On that account, there is no clear objective as well as ambiguity of the motivation that there is almost possible to encourage thai worker to compete and compare their accomplishment towards the goal set. Moreover, Thai workers are likely to do things in patterns and usually refuse to do things in a radical path that they might not familiar with. In

the long run, this behavior can jeopardize the system's growth by the lacking of efficient human development plan.

The lack of self-improvement perception of the Thai workers has led to many major drawbacks; chaotic when facing with troubles, no long term plan for trouble-shooting, lack of working systematically, and did not want to play as a team. As a result, most of the Thai's SMEs cannot be competed in the bigger market by it's own working perceptions. Despite the statement above, they are the perception of Thai working style by Thai worker. The list showed below is the perception of Thai working culture through foreigner's perception (R. Benedict).

- Refuse to change
- Seniority and conservative
- Unlikely to play as a team
- Lack of analytical skill
- Lack of punctuality
- Low sense of responsibility
- Lack of 'Pro-Active' schema
- Lack of work commitment

3.1.3 Market Nature of Frozen Food Industry

Through the globalization that the market of the product has been widen to be sold in international trade system. Therefore, the key customer of the ABC company's product is varied through regions, cultures, and norms. That is to say, the volatility of the market is highly burst as well as the tremendous amount of the opponent. The divergence preference of the key customers have made the design of the packaging so important regardless of quality and price.

Even-though quality is one of the major criteria that key customer will definitely judge but the large variety of products provided in the market had made quality issue is only "order of qualifiers". The order of winner is laid beyond the product's packaging design that attracted directly to the customers through it's

appearance. Total look of the packaging helps appeal the customer's attentiveness whether to buy or not to buy other than setting the price at optimum.

Additionally, the volatility of the demand and the endless need of the end customer have also pressurized the situation by shorten the product lift-cycle. Through many years of experience in this industry have proved that the product's life-span actually get shorter with more rapidly tempo each year. On that account, the packaging also needs to be changed its design more often to be market responsive.

3.1.4 Packaging Design Process And Packaging Production Process

From *Figure 6*, the packaging and product design was firstly began at the Research and Development of the ABC's headwater. The research team collaboratively works with head designer to deliberate the best concept idea of what product and inner packaging should look like. The general concept and idea came from the market insights given by Sales and Marketing team who have conducted the research regards the customer's preferences, demand forecast, and trends. Once these raw data was fetched together, the designer team will start to develop the idea and prototype packaging step-by-step which the packaging supplier will play it's part right at this stage.

The roles of packaging supplier are produce the very first lot of prototype including; color matching and calibrating, print marking, and packaging specification. All of these criteria have to be all approved by ABC company unless this first lot of prototype will be sent back to supplier for re-work. The lead-time of re-work might takes up to 14 business days which along this period all of the designed activities at the ABC company will be put to idle as it has to wait for the new lot of packaging coming in.

This idle time can caused ABC company up to 6 months as well as caused the supplier to suffer with waste cost from re-work. By this idle time uncertainty,

the ABC company's procurement team has to order others packaging material at exceeding amount as safety-inventory to be fed into production line while waiting for the new packaging from supplier. This long cycle lead time can be one of the drawbacks that hinder the ABC company to gain the "first-mover" advantage in such competitive market. By far, it can be implied that inner packaging production process imposed highly impact to overall production line.

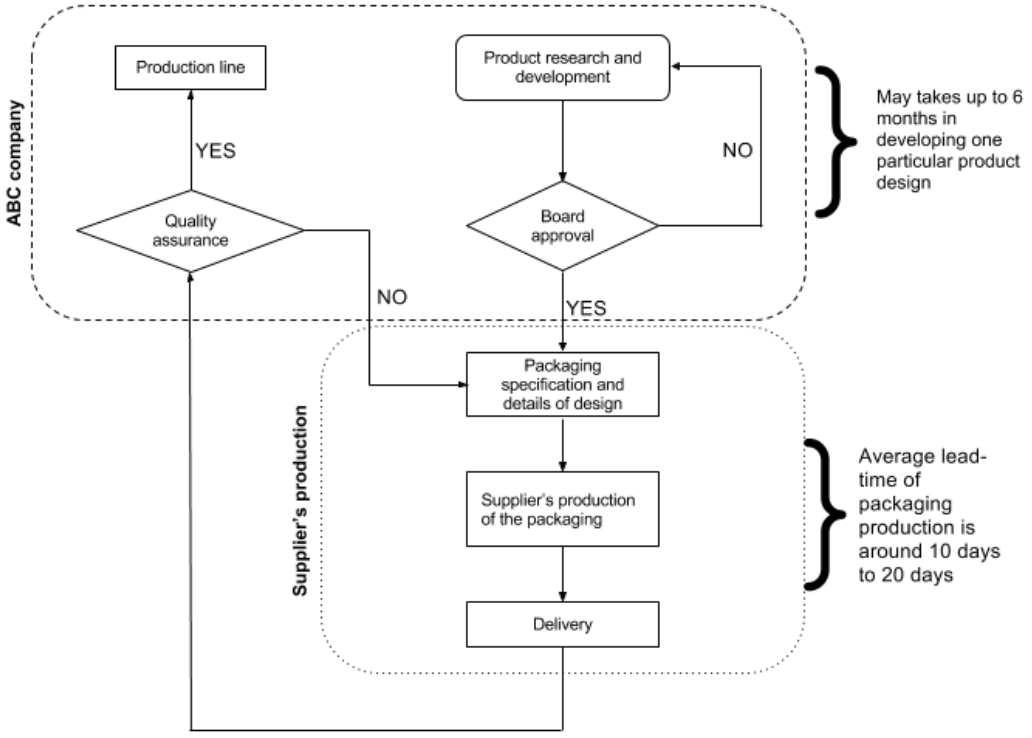


Figure 6 : Process lead-time of product development and design process (ABC company)

Lessen the cycle lead-time of design developing process and errors might improve the responsiveness of the ABC company to improve it's overall process efficiency as well as strengthen the relationship with the suppliers. However, the processes of making the packaging is different path from the designing processes. The process of producing the packaging started from the specification and designing details as well as other regulations sent from the ABC company to

the packaging suppliers. Once the data was retrieved, the supplier will start it's own production process which started with the raw material as "kraft" paper. Kraft paper is the major raw material of making carton box which 70% are from recycled paper and the other 30% are virgin pulp (T. Hovijit 2009).

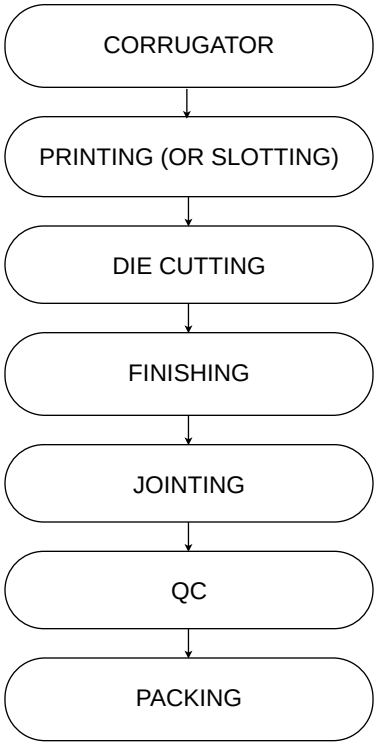


Figure 7 : Process of making paper carton box
SOURCE : T. Hovijit 2009

From *Figure* 7, the outer carton box processes started with corrugated technique that formed the kraft paper (kraft paper comes in forms of paper mill roll) into sheet board. Then, the sheet board will be put into printing and slotting by the ABC company's demand. To produce the carton box, the conversion of the corrugated sheet board will start at the printing and slotting process which the machine will print and slot (cutting and marking straight lines on top and bottom of rectangular carton box).

Through the technology burst, the printing and slotting machine can do the converting process within itself through the rotary die-cutting and folder-gluer

unit. The printing was carried by ink jet printer using water-based ink called '*flexography*'. On top of the machine is the ink tank that the ink will be pumped into the cartridge and works by gravitation function of the ink pump. Then, the ink will be passed to the rubber roll plate and stamp over the designed screen lines. This alternated process of printing and slotting will runs through the whole kraft sheet one color printing at a time. Generally, the Flexo-printing unit can print up to 3 colors; cyan, magenta, and yellow. The more color printed, the more precise operation and smaller size will be required (T. Hovijit 2009).

After the printing process, the flexo-machine will pass along to the slotting process, in other words, slotting is to vertically mark a creasing line onto the carton box and flap the box by cutting the top and bottom lid. Any rims of the carton box will be cut off through the die-cutting process which the machine will feed the kraft sheet with the speed of 120 pieces/min. Afterwards, the finishing process takes action by pull out the cut area (from die-cutting machine) and ensure that it is ready for jointing and flapping into rectangular box (T. Hovijit 2009).

3.1.5 Importance Of Information Sharing In Transparency Context

The information sharing processes should give benefit to both ends. In this case, the suppliers will benefit from the sales-forecast (conducted by ABC company) and the ABC company's production performance to streamline their own production and fleet planning. In parallel, the ABC company should leverage the supplier's information to balance its supply chain planning as well as to reduce the idle-time in case of packaging re-work.

The information shared from the packaging suppliers is believed to support the packaging design process that was produce in-house. The processes of the packaging design might involved with various departments and procedures; R&D, sales and marketing, and the packaging supplier itself. It normally takes up to six months long to design and approved the new packaging

for a new product launched. This cycle lead-time of the design process can be reduced through the information sharing by which the communication between the design team and the supplier will have more understanding and clarity of the idea. Therefore, the unmet specification and flaw of packaging must be reduced from the clarity of the communication obtained.

Underpinning the importance of the information sharing along the design process, it had been found that most of the packaging waste mainly occurred when any new packaging design was put into the production line. The problems ranged from under specification of the packaging, de-coloration printing, the inkjet screening was misplace. The root of these problems found were spotted right at the communication processes between the designer team and the packaging suppliers that shared insufficient amount of specification and idea.

3.1.6 ABC Company : Internal Review

– Company Background –

The ABC company is one of food processing manufacturer producing frozen food products for ready-to-eat market. The size of the firm is considered to be a small and medium size enterprise with the operational capital around 200 million Thai Baht. The company's expertise is frozen-baked products as the owner of the company is a former italian chef in 5-star hotel and own a premium italian restaurant which later differentiated itself into food processing field due to the shifted business environment. The majority of the product produced along the production line are frozen pizza, sausage rolls, and others baked products which packed in contemporary packaging that is easy to handle and microwave-applicable.

The focused markets of ABC company are exported to international market as Taiwan, Korea, Japan and European countries. The promising of the international market put up the ABC company's revenue with over a million US

dollar each fiscal year. ABC company is highly aware of the product quality as it is certified with the Thai-FDA (Royal Thai Food and Drug Association) and other quality assurance institutes. Currently, most of the product sold are being produced for the export market rather than serving for the local one, the ABC company also aim for expanding it's market into north America, Australia, Russia, and Canada. Therefore, quality is put at highest priority of the production line due to the quest to US market penetration had required supreme level of quality assurance.

The products produced can be categorized into 3 distinctive types; frozen pizza, frozen calzone and sandwiches, and frozen wrap and bread rolls. For the frozen pizza, the items are exists in variety of toppings ranged from chicken, seafoods, and vegan (for sell in middle-east market). The frozen calzone and sandwiches are also provided with variety of fillings as tuna, chicken, seafoods, meat, and vegan. The last category is the frozen wrap and bread rolls, again, the fillings and topping are in tremendous variety to serve the different culture of the key customers that some might allergic to seafoods and some are for the religion beliefs.

In consequence of the firm's size, many business setbacks found along the ABC company's supply chain cannot be solved by typical troubleshooting methods. By it's small size venture, some technique cannot be applied as the scale of suggested framework was much bigger than the firm itself that have made those frameworks invalid. However, among the techniques of supply chain troubleshooting, the transparency concept should be the most promising technique that can be applied into the up-stream chain and potentially soothe the problems away.

The current supply chain system that ABC company is being used is very obsoleted one that it was claimed to be an agedness system. This traditional function of the supply chain does not fit with the size of the company that is relatively small and has so limited access to the source of fund. The limited

access to credit permission has led the company to cope with many other business obstacles that was baffled the procurement policy and the supply chain planning matrix.

Funding restraints found had pulled back the ABC company's opportunity in technology advancement by which the firm still attached with the 'old-school' method to communicate with it's suppliers. For instance, the firm still uses phone-calls, facsimiles, and emails. In addition, there is no specific electronic softwares (such as EDI) had been employed due to its cost that was way to high for the firm to afford one.

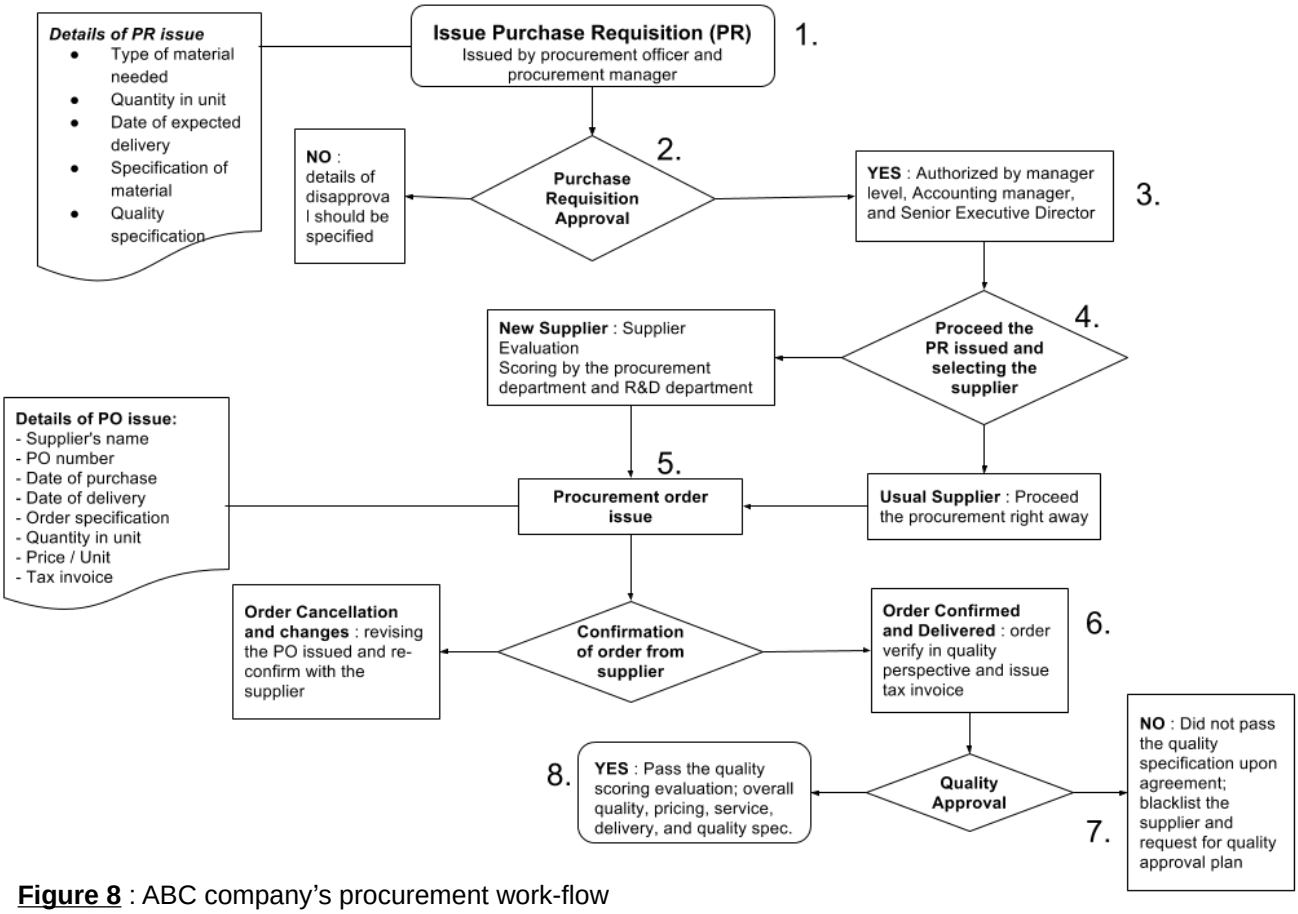


Figure 8 : ABC company's procurement work-flow

Currently, the firm uses Microsoft Excel to plan it's supply chain planning and other figures. Even-though the Microsoft-Excel is the simplest and most renown software but the supply chain planning is a complicated and delicate processes that need more exotic software function to facilitate the overall supply chain plaining.

To intensify the firm's procurement system, *Figure 8* has illustrated the current work system that has based mainly upon human relationship between the firm itself and the supplier's key officer. The communication between the two's was occurred through medium such as telephone, facsimile, and emails. These communication shared no specific data (such as monthly production plan, actual demand, or demand forecast numbers). As a result, the opaqueness in communication has led the mis-matching idea and specification to occur.

However, the current workflow still shows its strong point at it's robustness of the partner relationship that have been built through time as well as the personal relationship between the owners. The sturdy relationship has made the procurement processes flow with more flexibility by which in some cases of the purchasing order can be compromised to met each other's half way. Unfortunately, the weaknesses and risks of personal partnership is relied greatly on only few sources of the packaging supplier, inner packaging in particular.

Conversely, from the *Figure 9* illustrated below showing that the demand forecast of the ABC company had quite impressive precipitation. The demand forecast was about ±5% over and under forecast which is acceptable. The forecast was conducted on statistical basis that sales and demand history were used to calculate the prediction. As a result, the over forecast has led the manufacturing line to over-produced but this exceeding batch can be stored as safety-stock serving the volatility of the demand coming in. The safety-stock of finished goods can be stored up to 6 months long at -20c of refrigerated storage site before expired.

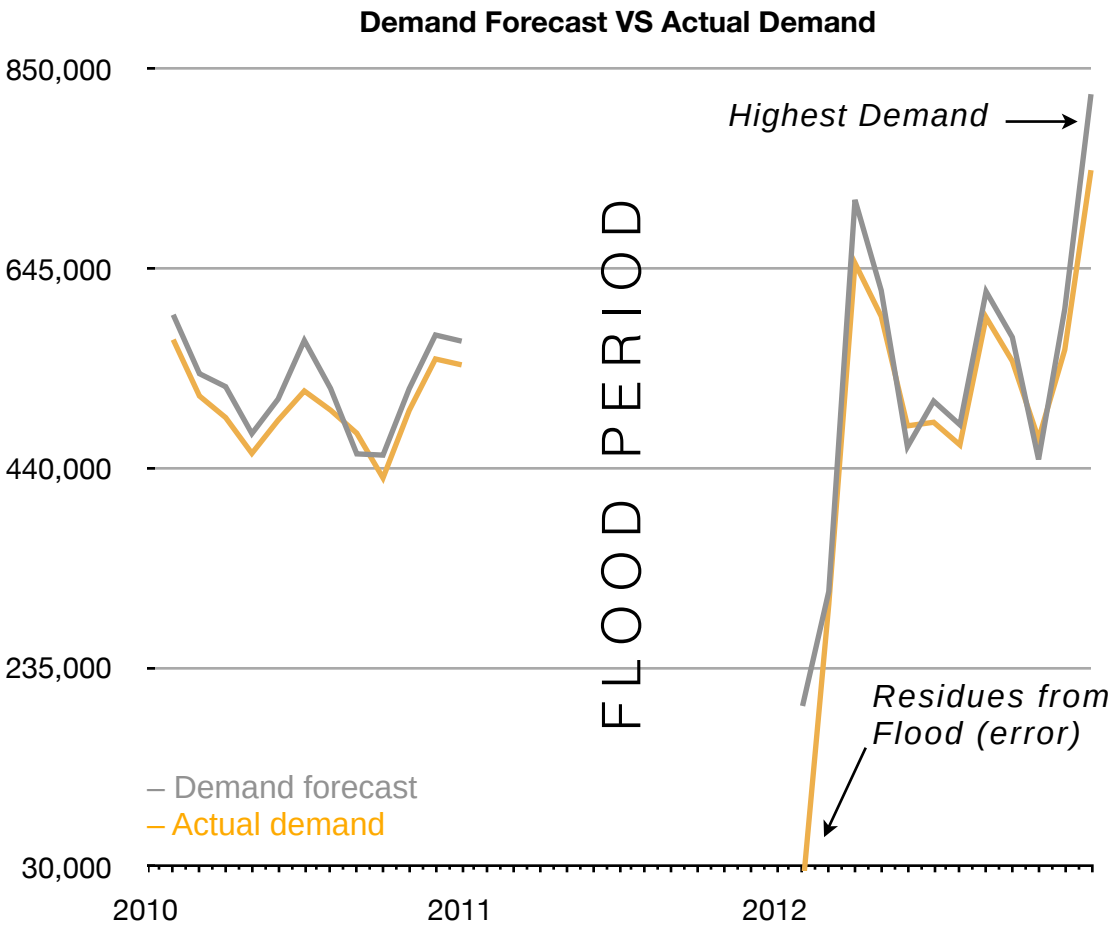


Figure 9 : Graph of demand forecast VS Actual demand of 2010 and 2012

Error of Demand Forecast												
	'01	***'02***	***'03***	***'04***	***'05***	***'06***	***'07***	***'08***	***'09***	***'10***	***'11***	***'12***
2010	-	-	//	-	-	//////	-	-	/	-	-	-
2012	/////// /////// ///////	-	/////	-	-	-	-	-	-	-	///	//////

Table 3 : Demand forecast error count
* Each "/" mean frequency of error in a month compared demand forecast to actual demand

From *Table 3*, in January ’12 the demand error had spiked up exquisitely as it was affected from the flood-effect residue. Regardless of the higher demand volume in 2012 compared to 2010, the actual demand still driven at same pace and pattern. Therefore, the over-produced of the final product was not the major drawback of the supply chain but the idle time while waiting for supplier’s re-work. Scrap and waste that need to be re-worked came from the mismatched idea between the firms and suppliers; opaqueness behavior that allows only 1-way communication to be occurred.

Cost Structure of NEO PIZZA SLICE HAWAIIAN					
Raw Material	**Type of Raw material**	**Price / KG**	**Costing sub-total**	**% Baht**	**Baht / Each**
Main ingredient	WHEAT FLOUR	20.98	608.42	7.62%	0.76
	DRY YEAST	158.00	36.02	0.45%	0.05
	SUGAR	24.35	17.05	0.21%	0.02
	Citri-Fi 200FG	420.00	60.90	0.76%	0.08
	KS 505	123.37	35.78	0.45%	0.04
	WATER	0.06	0.93	0.01%	0.00
	SALT	8.20	4.40	0.06%	0.01
	SHORTENING	75.00	88.73	1.11%	0.11
	MARGARINE	46.00	25.12	0.31%	0.03
Total			**877.34**	**10.99%**	**1.10**
Filling / Topping	PIZZA SOURCE (mixed pizza oil 0.5%)	32.21	322.14	4.03%	0.40
	CHICKEN BOLOGNA	105.00	1,155.00	14.46%	1.44
	PINEAPPLE	52.00	572.00	7.16%	0.72
	MAYONNAISE (AL)	57.00	399.00	5.00%	0.50
	MAYONNAISE (ORANGE)	57.00	399.00	5.00%	0.50
Total			**2,847.14**	**35.65%**	**3.56**
	Type of Packaging	**Price / Unit**	**Costing sub-total**	**% Baht**	**Price per piece**
Packaging	PACKAGING AT 120,000 pcs, 14PT	4.18	3,344.00	**41.87%**	4.18
	TRAY at 1,000,000 pcs, 16PT	0.73	584.00	7.31%	0.73
	CARTON 18x42.2x24.4 cm. A125/A125	10.00	333.33	4.17%	0.42
Total			**4,261.33**	**53.36%**	**5.33**
Grand Total			**7,985.81**	**100%**	**9.99**

Table 4 : Cost structure of *NEO PIZZA SLICED HAWAIIAN*

From *Table 4* and *Figure 10* , it was more than 50% of the total cost laid over in terms of packaging. It was expected that the waste level will be rescued as well as cost and inventory levels. By the distinctively characteristic of the packaging material requirements, it was very difficult for the ABC company to switching into other cheaper alternatives. This distinctive characteristic of the packaging material do come with the copyright fee to pay. Therefore, large amount of cost in packaging is comparatively high compared to other typical paper carton. However, the product manufactured still needs this type of inner packaging.

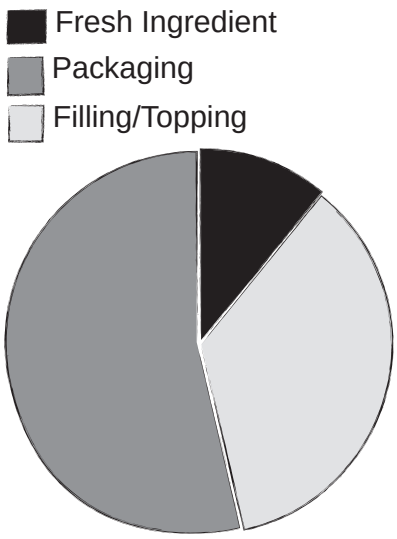
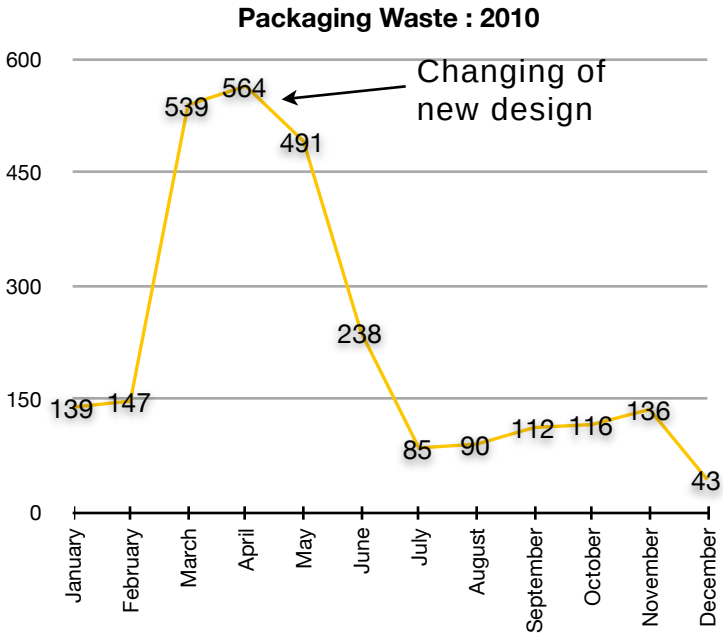


FIGURE 10 : Cost structure of main product

Most of the 'ready meal' product are necessitated with this inner packaging by the nature of the product itself. The product was first produced in the form of baked product that later will be froze and stored at lower than -16c to maintain it's shelf-life for over 6 month long. When the retailer sales the product as in convenient store, the product will be defrost and heat up through microwave to transform the frozen baked product back into it's nature. Consequently, the product and the inner packaging will be faced with both extremely cold and hot temperature which it is vital for the inner packaging to be very tolerable enough with this extreme condition.



Packaging Waste 2010	
	(unit)
Jan	139
Feb	147
Mar	539
Apr	564
May	491
Jun	238
Jul	85
Aug	90
Sep	112
Oct	116
Nov	136
Dec	43
Total	**2,700**

Changing of new design

FIGURE 11 : Packaging waste/scrap rate of 2010

From *Figure 11* illustrated, waste was defined as any scrap from unmet specification of the packaging either mismatched color, misalignment of design marking, or wrong physical material. Any waste will be sent back to supplier for re-work. The re-work cost was covered by the supplier as it was agreed upon the business deal. From the graph, it was showed that the waste level had spiked up when there is changing of the new packaging design which was more than double of the average waste rate.

3.1.7 Supplier Background (External study)

Most the packaging suppliers are relatively small venture that the registered capital were not exceed ten million baht (~$400,000 USD). The packaging used through the production line can be categorized into two distinctive categories; outer carton (have no direct contact to the product) and inner packaging (have direct contact to the product).

The inner packaging in extent to product temperament, it is required to have specific features, for instance, environmental friendly, recyclable, microwave compatible, food-graded material, formaldehyde free and less contamination. These specific features of the inner packaging realm the choices of packaging producer to be limited. As the matter of fact that ABC company is also small-sized venture that the buying-volume of the inner packaging is comparatively small unlike the tremendous volume of the biggest player in the industry. On the other hand, regarding to the cost, ABC company has to strictly concern on cost of the packaging as well to swell down those risks through the fixed cost.

The outer carton packaging is also important as it helps protect the inner products from dirt and other physical contamination along the transportation and shipping. The products were sold both in and out bound through the refrigerated container inside the cold storage to maintain the freshness of the products. By the total refrigerated shipping method, the outer carton needs to be made of double-faced crepe paper for the heavy-duty usage. However, there are tremendous choices of the carton box producers but most of them are in relatively small-sized and proprietary company that lacked of good management and information and technology infrastructure.

In general, there are 4 different packaging suppliers that supply different types of packaging material into the ABC company's production line. These 4 suppliers are small to medium size entrepreneurs which have relatively smaller size than the ABC company in terms of financial capability and production performance levels. The demographics of the packaging suppliers are from various backgrounds and physically geographical located. Therefore, lead-time of packaging delivery is one of the supplier's screening criteria other than the quality and specification of the product contracted.

Through the supplier screening processes, the ABC company's procurement department will generate the supplier list which addressed the

general information of the supplier; company's name, product expertise, price quotation. By this screening process, the firm will ascertain for the most optimum and most promising supplier that can achieve the firm's specification, not for the lowest bidder. Once the firm had the list of nominated suppliers, the firm will evaluate each of them through many perspective criteria scoring; quality, delivery, and after sales services.

Supplier Evaluation demographic							
NAME OF SUPPLIER				Supplier I	Supplier II	Supplier III	Supplier VI
TYPE OF PACKAGING				*Inner PE plastic paper pack*	*Paper carton (outer pack)*	*Specific shape paper pack*	*PE bag inner pack*
LEAD-TIME				20 Days	25 Days	10 Days	10 Days
Scoring Criteria	Overall	Truck Cleanliness	(5)	5	5	5	5
		Standard Quality	(5)	5	5	5	5
	Service	Collaboration upon request	(10)	9	9	9	9
		Readiness of document	(10)	10	10	10	8
		Document correction	(10)	10	10	10	6
	Delivery	On-time	(20)	20	20	20	18
		Problem solving	(10)	9	9	9	9
	Quality	Quality Specification	(20)	16	20	18	20
		Collaboration regards quality issue	(10)	9	9	9	9
Total score			(100)	**93**	**97**	**95**	**89**
Grade				**A**	**A**	**A**	**B**

Table 5 : Example of "PREMIUM SUPPLIER" evaluation score

The scoring criteria was designed to reflect the suppliers' nature and behavior whether they are suitable to the firm's supply chain system or not. After the first round of the preliminary processes, there are only the most promising suppliers left which the ABC company will put these suppliers who had passed into the list of registered suppliers (*Table 5*).

Explaining about the procurement processes, after the raw material issue purchasing order had been approved by the ABC company's committee, the details of the raw material specifications must be addressed; material specification, unit quantity, expected date of delivery, and quality requirements. In case of the purchasing order was disapproved, the procurement department of the ABC company will have to investigate the details why those suppliers had fail the screening tests. In contrary, the suppliers also have to re-address the resolved proposal back to the ABC company's procurement department as well.

From *Table 5 shown* above, the supplier evaluation scoring process will be conducted and weighting by the R&D department as well as the procurement department of the ABC company. However, the firm has to re-check the inspection of the order once again at the date of delivery. Any packaging material batch that did not pass the on-site quality inspection will be directly rejected right away to avoid any uncontrollable risks of off-graded batch and other uncertainties' consequences.

Problems Found From Supplier's Current System

From the conservatively way of communication between the ABC company and the supplier, this specific relationship built among the two were highly attached with personal relationship and highly emotional. Therefore, "Top-Down" policy has played great role beyond this specific relationship where the strong point was at the flexibility of the system that allowed any alteration settled down easily when any troubles occurred.

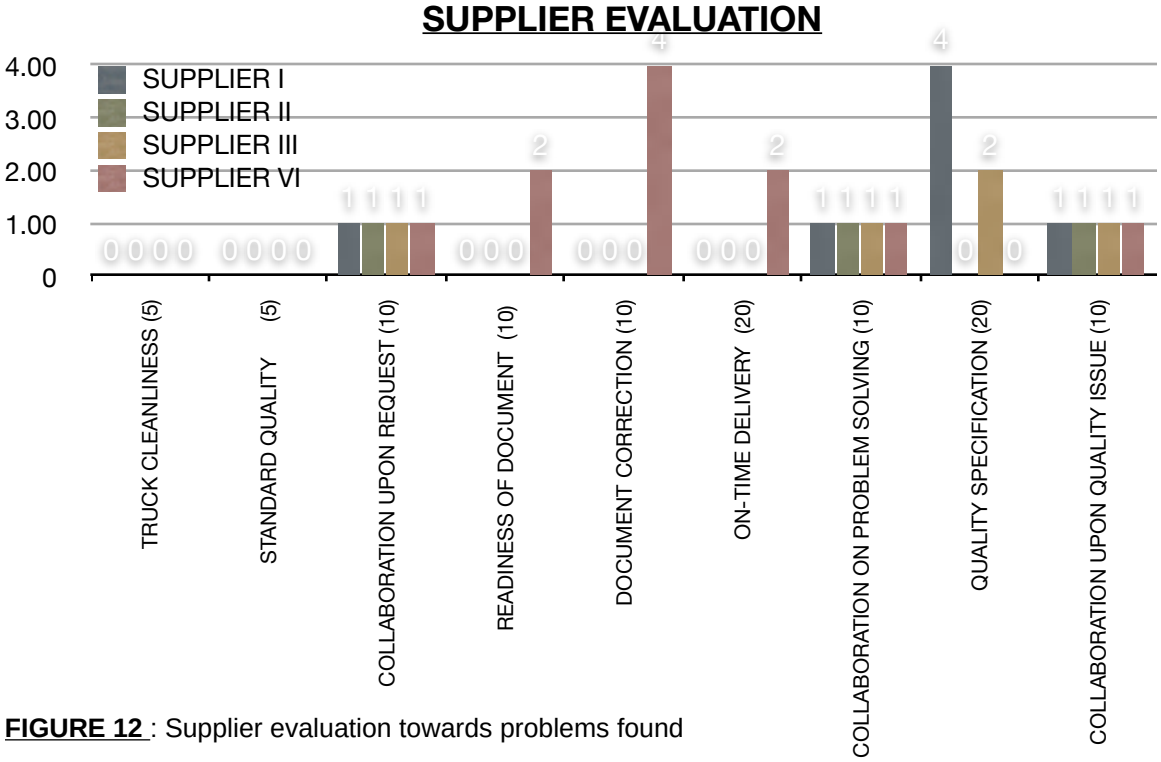


FIGURE 12 : Supplier evaluation towards problems found

From *Figure 12* illustrated above, most of the troubles found among suppliers from supplier's evaluation scoring criteria had proved that collaboration issue was the major problem found. The collaboration issue can be found beyond either in troubleshooting or in quality dimension. When any problems occurred, troubleshooting scheme had to be required upon personal request, not automatically collaboration towards trouble shooting. In other words, the supplier showed low ability to collaborate regarding the jointly troubleshooting dogma where low work-commitment was also found.

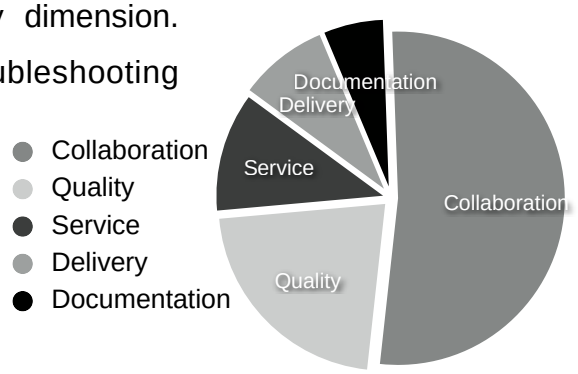


FIGURE 13 : Problems found in supplier's error

Regarding the ABC company's policy to acquire only the most compatible supplier not the lowest bidder. Therefore, the risk of limited choices of the suppliers was one blockage that the ABC company has to manage. On that account, the firm had burdened a great risk by relied almost to single source of packaging supplier which has forced the firm to share risks and uncertainties indirectly to the supplier as well. In other words, sharing risk and benefit can be trust-initiative scheme that can lead both firms to achieve higher transparency behavior and collaboration in the future.

3.1.7.1 Nature And Behavior Of The Suppliers

The packaging suppliers that supply the ABC company's operational chain are consisted of 4 different packaging suppliers. What these 4 suppliers have in common is that all of them exposed with least collaborative willing to soothe the unexpected trouble occurred. Moreover, the suppliers also showed that their products or after sales service were inconsistently met the quality and specification from time-to-time.

The major drawbacks were the collaboration and communication issues in terms of jointly fraternized operation towards the manufacturing itself as well as the troubleshooting response. The explanation beyond the collaborative difficulty was that the suppliers were sticked to the opaqueness of their service operation as they did not see the importance of being transparent. Most of the packaging suppliers have a similar perception that they task are only to provide certain product or services as stated on the contract deal. Other requests or problems would not be considered their responsibilities any longer.

These lack of compassionate and commitment to offer the 360 degree of best options and collaborations to the customer (in this place, ABC company) had lessen the trustworthiness of the supplier down. Trust issue might have been the real reason behind the secretiveness behavior that made the two to feel skepticism between each other. The skepticism will definitely lead the work commitment to be decreased as well as the increasing distrust. Distrust is also bring about many other drawbacks as the suppliers tended to focus only on individual rather than mutually collaborations.

Having mentioned about the supplier's size of entrepreneurship, as stated earlier that the supplier's size is smaller than the ABC company and relatively smaller if compared to the average of industry's norm. Therefore, it's petiteness of the suppliers is one of the factors that aggravated the current situation by both funding constraints and other insufficient of infrastructures. The extremely deprivation of technology infrastructure had made the opaqueness to be even more obscured. The choices of communications were very limited by the insufficient technology investment. There are only emails, phone-call, and facsimiles being used which was inadequate in the age of real-time data. On that account, the imprecise and ambiguity of the documentation and other information had been shared were evidently found. The wrongly shared data and mismatched assumptions had caused both the packaging supplier and the

production line of the ABC company with large amount of damages through waste, other fixed cost, and lateness in production time slot planning.

Regardless of the difficulties found through the supply chain manner, the selected packaging suppliers were approved under the criteria of that they exposed the ability to fulfill what was needed regarding the ABC company's economic of scale. As the matter of fact that the ABC company itself is relatively small entrepreneur compared to the industry's average, larger suppliers had been ignored to collaborate with this small-sized scale. It is true business nature to consider the economic of scale in order to survive through tough cost and economical down-time. According to the economic of scale issue, signing contract with smaller supplier or similar in size of supplier that is willingly serve the most promising service and product that the company needs has been put into the highest priority.

3.2 PHASE II : Transparency Model Formulation

This phase is to perform the transparency framework formulation which the conceptual design of the framework will rely closely to the information sharing dilemma. This phase will intimately show how the information sharing activity can increase the transparency of an organization through the alteration of the current work-flow. The framework formulation processes was started with identification of the possible area to implement the transparency as well as to identify the benefits obtained.

From the problems stated, the openness and accessible of data are the key to transparency management where the information should be shared easily and accessible by any ends. The charismatic of information sharing is that it helps nurture trust among partnership by which mutual collaboration can be obtained from that. Focusing of information sharing, the protocol of sharing any information can be done through many techniques regarding the differences of working cultures, investment limitation, and technology platform requirement.

Follow the steps towards transparency, both firms had been indirectly pressured to trust and lean on one another's reputation and responsibility by maintaining it's own performance at its best. In other words, accessing the business partner's data has come with great responsibility unless trust will be compromised. Therefore, the most difficult part of implementing the transparency framework was to convince the other that one is trustworthy and responsible enough.

From *Table 6*, the formulation of the transparency framework had started at identifying the area of opportunity in implementing transparency under given constraints. The alteration of the current system suggested that the first stacks of information shared should be the 'Sales Forecast', 'Actual Production Performance', and 'Cost structure' as these sets of data can help the suppliers to improve their production and resource planning. It was expected that the supplier will leverage the beneficial of the ABC company's sale-forecast by balancing their own production plan with more clarity based upon the fact that the data given was not more than 5% precipitated.

	Area of opportunity	**Weaknesses**
ABC company	- External communication - Strong relationship between executive where top-down policies should be easily possible	- Funding constraints - One-way communication - Opaqueness in communication
Supplier	- Intense expertise in packaging - Not too larger in scale which is matching with ABC company - Ability to perform on promised - Be able to initiate the Top-Down policy	- Funding constraints - Technology platform - Human resource and training activity - Hesitate to report the problems occurred

Table 6 : Area of opportunity in transparency model formulation VS weaknesses

In return, the ABC company can see more clarity of the supplier's production line as well as lessen the idle-time from re-work as the scrap rate will be reduced through the information sharing scheme. The information shared from the supplier included the production lead-time so that the ABC company can roughly predict and plan for the supply chain planning. The jointly collaboration through this information sharing activity can lead both firms to be more responsive to any changes in volatility of the current market.

Having said that nurturing trust among partnership can be varied in many stages depends on time, experience, and intensity of relationship (S.E. Fawcett et al. 2012). Currently, the ABC company and the packaging suppliers were not jointly collaborated since the very beginning of the start-up, only executive levels that was jointly collaborated through personal relationship. Consequently, the collaborations was limitedly found and it was hardly to grow any further as the two has kept their relationship at distance. However, there are still some opportunities to nurture trust beyond such relationship where two parties have shared common similarity towards business goal congruence that it is not necessary to achieve the lowest in short-term cost. Thereafter, the classical open-book negotiation technique regrading short-term cost reduction might jeopardized trust among relationship.

The framework formulated from identifying current system's weaknesses will immensely leverage the uniqueness of each individual as part of the roadmap to future bench-marking. Besides, the information sharing activities upon the framework suggested, new work processes will reveal the firm's real capability and production performance that they can exceed beyond their limits. The exclusively shared information internally and externally of the firms will illusively address the openness manners of the working protocol towards the collaborative trust with higher data accessible ability.

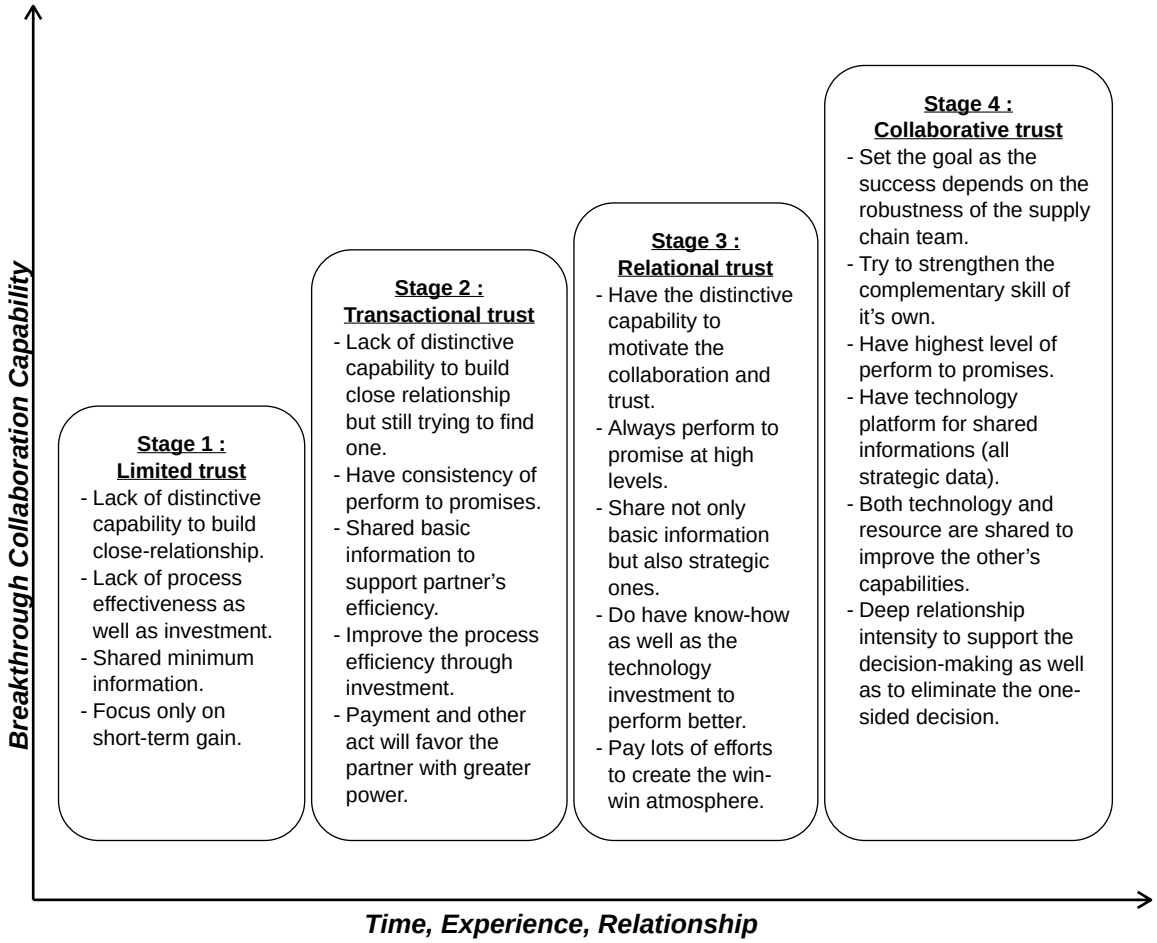


Figure 14 : Trust maturity framework
SOURCE : (S.E. Fawcett et al. 2012) Supply chain trust : The

From *Figure 14* illustrated above, prior to the new transparency framework had been proposed, the ABC company and the suppliers were spotted at the very first step as "limited trust". From this first step, both of them had fit all of the features and characteristic of this levels; limited capability to build closer relationship as both of them preferred to kept the relationship at distance. In addition, insubstantial levels of information had been shared externally among each other as well as both of them had neglected the important of investing either in technology or human resource to strengthen the fairness business

atmosphere. Yet, both the firm and the suppliers still showed some ability that can be improved into further stage as both of them can perform very well to promised. It can also be implied that the process efficiency of the two were at optimum level which the technology investment can even improving the overall effectiveness and enhance their relationship at length.

3.2.1 New Transparency Model Suggestion

Follow the steps of overhaul the structure of the organization to be more transparent showing in *Figure 15*, the workflow alteration suggested should push the two into the second stage; transactional trust. This new procedure will allow each other to share more essential information in timely manners (no strategic or confidential data required beyond this stage). The alteration had indirectly forced both the firm and the suppliers to share basic data with correctness and relevant.

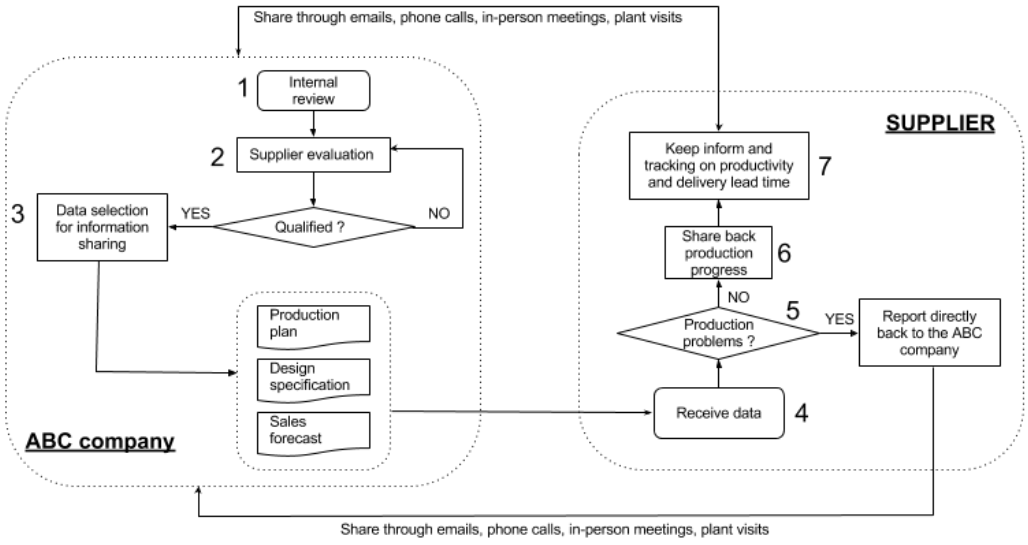


FIGURE 15 : New Transparency model proposed

The framework had required the involved employees to share their own information to the other once a month in order to improve not only the strategic planning of production and resource but also to strengthen their relationship to be closer. Not only the overall process efficiency should be improved, the in-house

operation should give the better results as well by the fact that the information sharing will allow the other to audit each other's performance indirectly.

By far, at the end of *Phase I and Phase II* of AS-IS study both ABC company and supplier, the possible area of improvement had been notified where the proposed transparency framework will be configured based upon those findings. In addition, the proposed model will be customized to be at most fit with Thai working style according to overall industrial study.

3.3 PHASE III : Model Validation

3.3.1 Implementation Procedure

The implementation process of the transparency model was the broad idea to validate and evaluate the current business components started with convincing the suppliers to underpinning how importance of supply chain transparency is. It is essential to address the win-win benefits gain from adopting the transparency model. The transparency model will be implanted into both side of the supply chain, ABC company and the packaging supplier to enhance the process efficiency of the two.

Throughout the model implementation processes, both ABC company and the packaging suppliers will jointly collaborate in information sharing through many dimensions. However, this model is only the initiative steps of adopting transparency behavior into the organization. This overhaul of work-process reengineering is required great interpersonal skills of the staff to overcome the changes that will be occurred. According to the "change management", there will be rejecting stage at the very beginning of the implementation from the employees whom hesitate to change.

Right amount of incentive and right motivation should be given to all involved employees. The model suggested was designed under restrict funding constraint and the economic of scale, therefore, the model has emerged with

minimum budget and affordable. There is no advanced technology infrastructure needed along the model implementation as it was only to validate the hypothesis claimed whether the transparency concept is feasible or not.

(K. Loretta 2013, IBM 2003)

Step 1 : Internal and external assessment towards the business goal congruence

This stage involved internal review to identify and evaluate it's own ability of the ABC company as well as the supplier evaluation. At this stage, the goal towards the new strategic model and the specific problem of the enterprise should be addressed. It should also stated the exactly level of how deep the model will be implemented into the organization in order to resolve the problem found. Along the internal and external assessment, the current process flow should be analyzed in order to discover the area of improvement.

- ***Specific problem*** : miscommunication between the firm and the supplier which led to mis-matched specification of the packaging and scrap rate
- ***What level should the model be implemented*** : only at the initiative level such as the procurement department, the R&D team, and sales representative between two firms.
- ***Technology requirement for integration*** : sharing the information through emails, phone calls, and in-person meeting
- ***Area of improvement*** : communication between the firm and the packaging supplier
- ***Time frame*** : 12 months
- ***Model vision*** : Moving the firms towards transparency and achieve higher efficiency performance
- ***Tasks*** : Share particular information or document between one another on regular basis and timely manner

• ***Mutual benefits*** : Enhance the ABC company's inventory management as well as lessen the scrap rate through communication improvement. On the other hand, the suppliers can have easier access to the demand information which can support their production performance to be better and more accurate with less waste and cost.

Step 2 : Management Of Change Regarding Human Resource Issue

At this second step of transparency model implementation, the goal has been set to achieve the initiative benchmark of transparency through information sharing activities. Through the information sharing, both firms will leverage the mutual benefits of doing so by achieve better production performance through the accuracy and relevance of the information shared on timely manner.

It is very important for ABC company to assure that every involved staff in implementing this transparency model knows what the final results should be. Underpinning the importance of the transparency should be clear-cut strategy for the team to achieve the goal. Project leader from both firms should be set to ease out the change rejection along the process reengineering.

- *Data shared* :

ABC company (from ABC company to supplier) :

- share demand forecast : every 3 months via emails
- monthly production plan : once a month (or when any change in monthly production plan occurred) via emails platform
- details of packaging specification : once a week via emails, phone calls, and twice a month in forms of meeting or plant visit

Packaging supplier (from supplier to ABC company)

- share the production capacity : once a month via email platform (or inform as soon as any change occurred)
- schedule of production : once a month through email platform (or any change occurred)

- delivery status : keep inform the delivery status every week or more often (every 3 days) when the inventory is dispatched and out for delivered

Step 3 : Progress Report And Scheduling

By far, the process implementation has been partly grafted into the current system, scheduling the in-person meeting between the ABC company and the supplier's key staff to discuss the process is required. The meeting will provide the list of what have been accomplished by far, what is on-schedule, what is behind the schedule.

Right at this stage, reward system should be established in order to recognized the success and achievement done throughout the reengineering process towards the transparency issue. Due to the funding constraints of the supplier, it was beyond reach for the ABC company to take any action onto the supplier's incentive alignment at this point. The rewards system established for the ABC company's employees was through over-time and commission to compensate with the more work-load required during the model implementation.

Step 4 : Model Validation And Configuration

From the procedure set (exchanging of information between the firms), the progress will be report back directly to the upper level of management to keep the executives informed on what was really happening. The problems found along the model implementation should be addressed when appropriate and needed. The trouble-shooting scheme should be discussed upon two firms through in-person meeting scheduled to configure any flaws found.

3.3.2 Comparative Review Of Current System And New Designed Model

	Strength	Weakness
Current system	- Strong relationship between executives - Need no training system for human resource	- one-way communication - Opaqueness - Inefficient of communication - Mismatched idea - Non-responsive
New transparency model	- Two-way communication - Openness - Responsive for problems occurred - Transparency behavior - Helps improve process efficiency	- More workload needed to performed - Training program required for employees - More often meeting held - Inequality in incentive alignment

Table 7 : Comparative review of current system to new designed model

From this *Phase III of model validation*, the proposed framework was completely grafted into the current system followed the steps of implementation suggested in this phase. After implemented the proposed transparency framework regarding the information sharing activity, the results of this framework will be intensely monitored through varieties of indicator to measure both quantitative and qualitative results in the following phase.

3.4 PHASE IV : Results Measurement Criteria

The results obtained from the research will be measured into 2 distinctive methods; quantitative and qualitative. The quantitative result of the research included the numerical data that can be tangibly measured such as scrap rate, cost, and inventory level of the safety stock. In contrast, the qualitative dimension of the research is to identify how well the transparency model was implanted through employees' perception.

The qualitative questionnaires will generally measure such emotional aspect regarding the transparency framework embedded (working culture, relationship hierarchical, satisfaction). To the extent of qualitative aspect of the results, it can reflect the subtext of transparency through the sequel of relationship analogy. Findings regard working cultures and behaviors of the employees through observation can be implied to support the decision making in management levels.

It was strongly convinced that these qualitative results will divulge the hidden problem regarding the transparency model implementation. In addition, the likelihood of unforeseen situation can be identified earlier of the implementation steps through the presumable embarking of the model. On that account, the strategic alternatives can be easier planed and installed through tremendous of parameters and criteria endorsing the company's supply chain capability and overall performance.

In summary, the transparency framework was formulated from the up-stream supply chain problems found, in particular, the insufficient of communication method between the firm and its suppliers. The communication problem occurred had caused both firms to suffer with exceeding cost, uncertainties of inventory and waste level, and wasteful idle-time. Therefore, the 'Information Sharing' technique has put into play as it was concretely believed that such technique can enhance the data convergence and synchronization of the goal as well as to increase the transparency behavior for long-term relationship.

The formulation of the transparency framework was started by identifying the area of improvement parallel with the identification of possible area in implementing the suggested framework. The implementation of proposed model had been monitored for over 12 months which the results obtained will be critically analysis by both qualitative and quantitative research manner in the next chapter.

CHAPTER IV
Research Results

The results obtained from previous chapter will be comparatively analyzed in this chapter which the results obtained will be interpreted upon academic theories suggested in literature reviews. Results obtained was strongly believed to be the conundrum of the opaqueness behavior of both firms' supply chain system which the proposed transparency framework has taken its part in paving the current system to the new radical trouble-shooting practice.

The experimental practice towards the proposed transparency framework has been put into real trial since January 2012 for 12 months time-frame. During the fiscal year of 2012, the data of waste level, cost, sale, and packaging inventory turnover were collect to monitored the progress of process alteration. Thereafter, the culmination of 2012 data will be comparatively analyzed to the current system based on 2010 sets of information (the year 2011 the factory had suffered from great flood incident which it had to shut down for over 6 months period of the year).

In other words, the proposed transparency framework was intended to acquire the rhetorical insight progress of the work-flow alteration regards the accessibility of the information sharing and leverage by both firms. The comparative results and progress obtained will validate the proposed framework is favorable or not in real practice. The information sharing activities designed in this framework included; demand forecast, actual demand, production plan and performance, and details of packaging design. These shared information were in quantitative platform which superimposed the procurement process' efficiency. In addition, the inventory turnover had been used as an indicator to explain how well the firm managed it's inventory.

Subsequently, cost of inventory will also be reviewed to validate the new transparency framework whether it's properly functioned or not. Moreover, the

proportion of waste level (scrap from mismatched color, designed, and specification) will be another indicator measuring the performance of the new framework through quantitative manner. In contrast, the qualitative findings obtained from questionnaires surveys and observation will be conducted and interpreted accordingly. On that account, the interpretation of such qualitative results will be only conducted to presume employees' commitment and satisfaction level, not to judge right or wrong of the transparency's abstruse ambiguity.

4.1 Quantitative Results Regard The New Work Flow Projected

4.1.1 Waste Reduction

Packaging waste is another indicator to quantify the efficiency of the procurement process. Packaging waste, in this research's scope involved only the wasted that prevailed by the suppliers along the procurement scheme and the dead-stock of the packaging raw-material. Precursor of packaging dead-stock were predominantly rooted from excessive amount of safety-stock that was intentionally ordered to insulate the risk of raw-material shortage.

Waste Level	
2010	2012
(unit)	(unit)
139	19
147	230
539	227
564	215
491	216
238	118
85	130
90	128
112	92
116	46
136	110
43	327
2,700	1,858
by unit	-842
by percentage	-31.19%

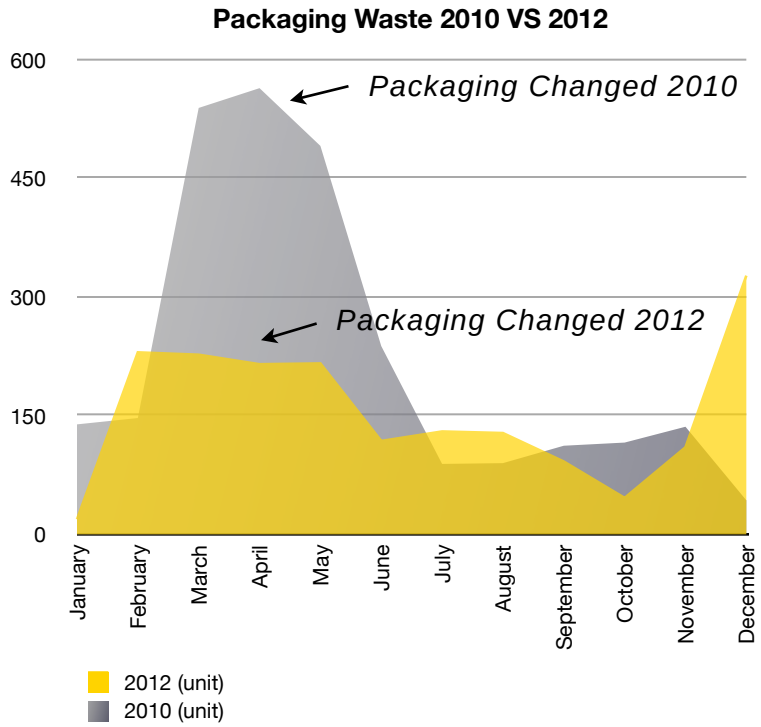


FIGURE 16 : Scrap rate level 2010 VS 2012

By the risk management policy and for being agile to any threats, the ABC company intended to keep the safety inventory at about its ceiling to avoid any material shortage and to minimize the idle time. Plant shut-down can mean large amount of cost spilled out by which balancing those risks and uncertainties seemed legit to keep the safety-inventory as high as 60% of the actual production and average goods sold. From time to time, those safety-inventory that have never been put into used would turned into dead-stock due to it's expired date and agedness design. In addition, the unmet specification and mismatched color and design from the error in communication between two firms had caused large portion of waste which simultaneously occurred once the packaging design has been changed.

After performed the information sharing activity regarding the transparency framework, this new system has urged the lower amount of safety-inventory

brought in which the amount of dead-stock has been reduced down. From *Figure 16*, the openness and often communication that has been forced to perform due to the process alteration has proved that it can reduce the waste from communication error down as well. Consequently, both firms have the opportunities to communicate more often through transparent manner parallel with basic information shared.

In the fiscal year of 2010 that current system still attached, the waste was as high as 2,700 unit which the highest spike was at almost 600 in April where there was changes in packaging design. Comparatively, in the year 2012, the waste level was reduced down into half of what in 2010 based on annual packaging new design launched. By the end of 2012, the waste level has been reduced into 1,955 unit compared to 2,700 unit in 2010 while the production line was also velvety smooth. However, in December 2012, the waste level had rocketed to hit its new high at 768 unit which was the results of highest demand as well as the internal error (one of the ink jet printers in the ABC company's production line was malfunctioned). Therefore, it can be implied that, the new concept of transparency framework and information sharing activity is favorable in terms of waste reduction.

Hence, the scrap rate had plummeted down at significantly of 31.19% lower than in 2010. This waste reduction had underpinned its importance of transparent communication that not only enhance the process efficiency but also strengthen the relationship with strategic supplier and cost saving (C.S. Tang 1999).

4.1.2 Packaging Inventory Turnover

According to the transparency framework proposed, the improvement of the communication and accessibility of the information had revealed a very satisfied results in terms of inventory turnover. As stated in the literature reviews that transparency behavior definitely had an effect on inventory management performance which the convergence of information had allowed the accessibility to be easier. The easier access to such information can intensify the overall processes by diminished the flaws in communication to be at minimum. In contrast, the information sharing is also enhancing the supplier's capability while maintain the firm's production performance at steady level with better risk controlled.

From *Figure 17*, the lower level of inventory turnover had imposed the firm's ability of being more "LEAN" but yet responsive enough to any changes and threats found due to the controllable of the packaging material uncertainty

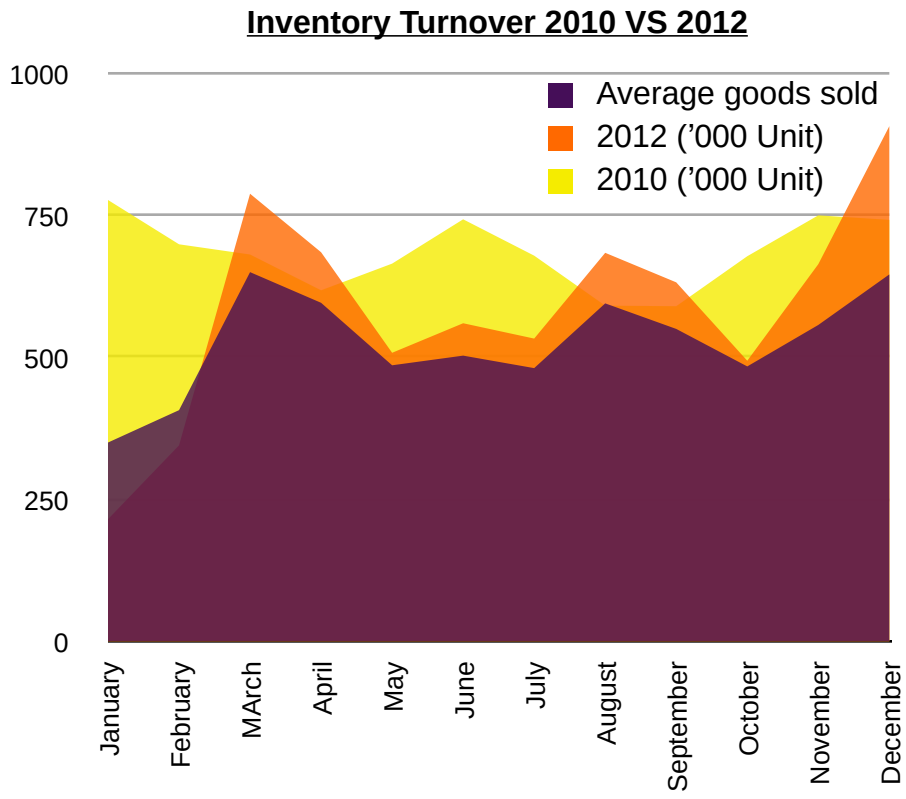


FIGURE 17 : Packaging inventory level 2010 VS 2012

that was reduced along the information sharing activity implemented. This inventory turnover level was based upon the criteria that it has to be at the most optimum level where there will be no packaging material shortage. From *Figure 14*, the inventory turnover was scientifically compared to the average unit of goods sold which reflected how well the ABC company has managed its inventory level.

Compared back-to-back between 2010 and 2012, it was clearly that 2012 has much better inventory turnover than 2010 which the reduction of unmet specification packaging batch was eliminated by the alteration of the communication flow. The uncertainty of packaging supplier's error was also reduced, therefore, the idle time from re-work of under specification packaging was also reduced down which the safety-inventory level can be brought in at lower level while risk balance still under-controlled.

4.1.3 Profit and Loss Statement

From waste reduction and inventory turnover results, it was proved that these dimensions stated were fused tightly together where the seamlessly interfaced of these combination has laid at the transparency and openness of the communication technique. As illustrated in *Table 8 and Table 9*, the information sharing practice was very favored by the -14.59% deduction of the inventory cost as well as -31.19% by waste reduction. The total money saved by this two criteria was almost 11 mTHB which validated that the openness of the communication can enhance the overall process and reducing the cost.

INVENTORY LEVEL				
฿5.33/unit	2010 ['000 unit]	2012 ['000 unit]	PAR stock 2010 ('000BATH)	PAR stock 2012 ('000BATH)
January	777	215	4,141.41	1,145.95
February	699	345	3,725.67	1,838.85
March	681	788	3,629.73	4,200.04
April	618	685	3,293.94	3,651.05
May	665	508	3,544.45	2,707.64
June	743	560	3,960.19	2,984.8
July	679	533	3,619.07	2,840.89
August	591	684	3,150.03	3,645.72
September	590	632	3,144.7	3,368.56
October	678	494	3,613.74	2,633.02
November	750	664	3,997.5	3,539.12
December	742	907	3,954.86	4,834.31
SUM			**43,775.29**	**37,389.95**
Decreased by (BAHT)				**6,385.34**
Decreased by (%)				**14.59%**

Table 8 : Comparative result of INVENTORY LEVEL 2010 VS 2012

PACKAGING WASTE COST				
฿5.33/unit	WASTE 2010 ['000 unit]	WASTE 2012 ['000 unit]	WASTE 2010 ('000BAHT)	WASTE 2012 ('000BAHT)
January	139	19	740.87	101.27
February	147	230	783.51	1,225.90
March	539	227	2,872.87	1,209.91
April	564	215	3,006.12	1,145.95
May	491	216	2,617.03	1,151.28
June	238	118	1,268.54	628.94
July	85	130	453.05	692.9

PACKAGING WASTE COST				
฿5.33/unit	**WASTE 2010 ['000 unit]**	**WASTE 2012 ['000 unit]**	**WASTE 2010 ('000BAHT)**	**WASTE 2012 ('000BAHT)**
August	90	128	479.70	682.24
September	112	92	596.96	490.36
October	116	46	618.28	245.18
November	136	110	724.88	586.3
December	43	327	229.19	1,742.91
SUM			**14,391.00**	**9,903.14**
Decreased by (BAHT)				**4,487.9**
Decreased by (%)				**31.19%**

Table 9 : Comparative result of PACKAGING WASTE 2010 VS 2012

From *Figure 18*, it was proved that suggested framework regarding the information sharing practice can reduce the cost through 3 different sources; better process efficiency, better inventory turnover, and minimize the packaging uncertainty. Firstly, the proposed framework has enhanced the overall process efficiency that the scrap rate was lessened as well as the cost of waste was lessened. Second, the packaging raw material turnover was improved through the lower level of the safety-inventory brought in due to the risk of packaging material shortage was minimized. Therefore, cost held in forms of inventory was also decreased down. Lastly, the bigger sales volume due to the volatility of the demand that tailgated the profitability of the ABC company to grow bigger.

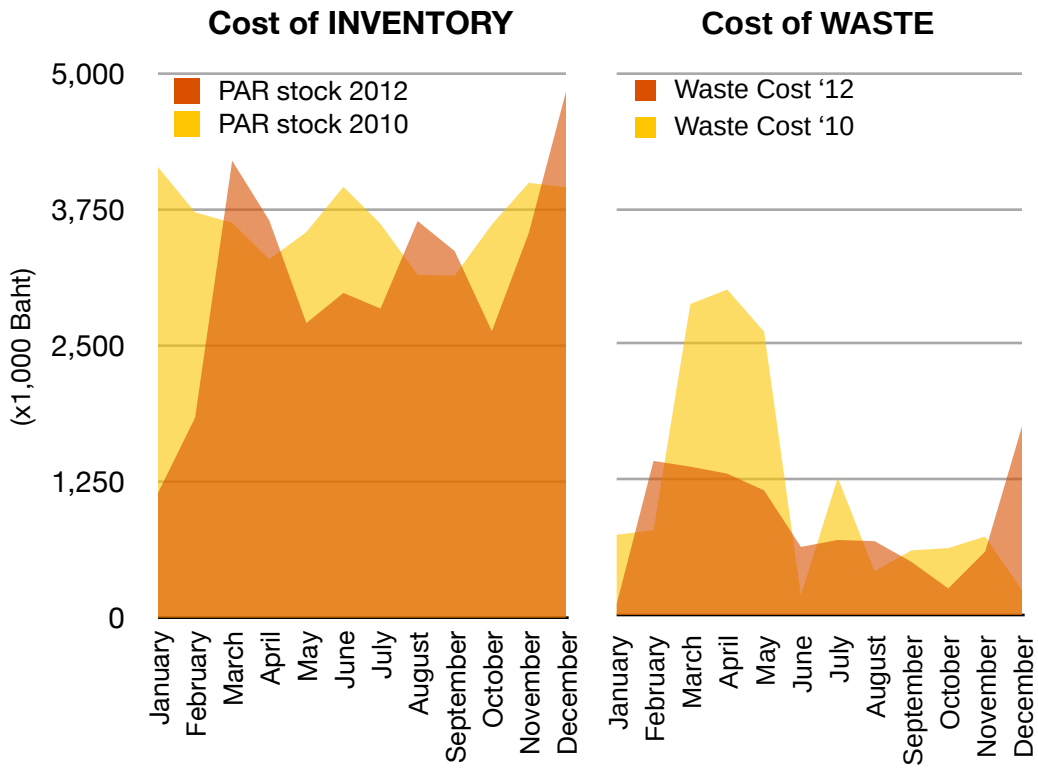


FIGURE 18 : Cost of WASTE and INVENTORY 2010 VS 2012

4.2 Qualitative Results Regards The New Transparency Model

4.2.1 Questionnaires Design

Apart from the comparatively quantitative analysis in the second phase, the qualitative measurement will be reciprocally performed through questionnaires, interviews, and intense observations. The questionnaires were intentionally set to reflect the levels of work-commitment and to reveal how was the employee perceived regarding the information sharing tasks given. The questionnaires designed processes in *Figure 16* were a 7-point scale indicating 'agree' or 'disagree' of each statement based upon the supply chain collaboration between the firm and the suppliers (1 = strongly disagree, 5 = strongly agree).

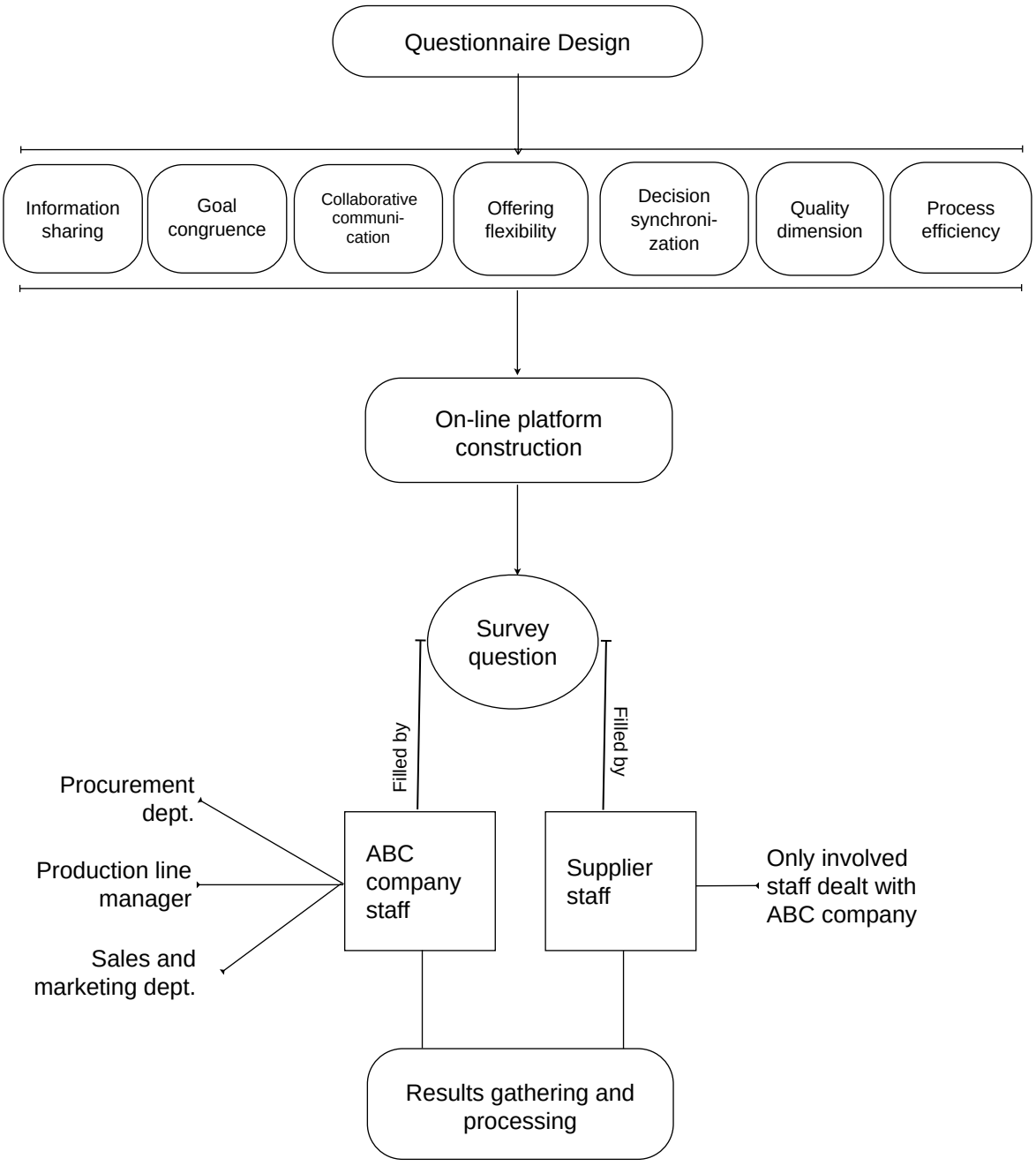


FIGURE 19 : Questionnaires design scheme
SOURCE : Adapted from S. Ideta 2007

The qualitative results from the questionnaires can be implied by various parameters and indicated different impacts on the supply chain collaboration that has been put into experiment. The questionnaires were asked to be filled by both internal staffs and the supplier's employees acquiring their perspective and perceptions regarding the other's performances and abilities. Similarly, there will be interrogated to complete the sets of questionnaires from the suppliers's side in order to clarify the supplier's view towards the subjectivity of the ABC company's potential. Having the questionnaires filled, the changing parameters had mirrored the true nature of the relationship and behavior of the two as well as to reflect the likelihood of shifting nature of the transparency.

In other words, the questionnaires were designed to measure the pure abstract of intangible aspect of the transparency criteria; satisfactions, distrust, and commitment level. These emotional perspective was firmly believed to expose the firm's readiness to initiate the transparency model through the information sharing or not. Underpinning the importance of goal congruence towards the transformation to be more transparency, this can be one major factor to improve the overall supply chain goal together. To the extent of measuring these intangible findings, the questionnaires and interviews can superimpose the deeper understanding of these emotionally presence which will lead to the more concrete solutions to enhance the process efficiency.

4.2.2 Questionnaire Interpretation

The results obtained from questionnaires will be comparatively analyzed between ABC company's employees and supplier's employees in a statistical manner. The main theme of the survey is to understand any intangible and emotional issues of the respondents regarding the satisfaction and commitment. The following questions of the survey were based upon different dimensions of the hygiene factor according to Herzberg's theory. The questionnaires were also designed to be as simplest as possible to minimize the errors (S. Ideta 2007).

Content of questionnaires	Meaning
Demographics of respondents	Gender Age range Educational background Work position
General perception towards the company and work satisfaction	- Salary satisfaction - Company policy satisfaction - Work environment and relationship among colleague - Commitment through self-improvement These questions were designed to explore each respondents' motivation through hygiene factors (Herzberg's theory). The assumption was to measure the employee's satisfactory level through these questions. Proper level job satisfaction and arousal can lead the company to achieve more profit through high quality human resource.
Perception towards general business synchronization	The questions of this content were set to undergo how the employees perceive general business synchronization of their company. On the other hand, this dimension can reflect how well of the transparency model graft in the earlier stage of the research. - Do both firms have an agreement on business goal ? - Do both firms know the importance of the supply chain collaboration ? - Do your firm show transparency behavior along the supply chain ? - Do both firm have jointly collaborate to improve the supply chain performance ? - Do your firm jointly develop the demand forecast with the other ? - Do both firms jointly manage the inventory system ? - Do both firm co-develop any system to evaluate each other's performance ? - Do your firm and supplier's share loss, benefits, and risks ?

Content of questionnaires	Meaning
Perception towards overall process efficiency and quality issue	- Do the productivity of your firm meet the standard of the industrial norm ? - Do your firm offer flexibility in product variety ? - Do your firm offer different service and feature compare to industrial norm ? - Do your firm have good customer's responsiveness ? - Do your firm provide high quality product to end customers ? - Do your products highly reliable ? - Do your firm and the supplier help each other to improve the product quality ?
Satisfactory level regarding the transparency model suggested	- Do your firm exchange information with the supplier ? - Do your firm often exchange the information with the supplier based on regular basis ? - How was the information accuracy ? - Do your firm share confidential information to the supplier ?

Table 10 : Questionnaires interpretation criteria and meaning
SOURCE : Adapted from S. Ideta 2007

The respondents filling the questionnaires were 2 distinctive groups; one from ABC company and another from supplier's. The respondent were selected randomly from the selected involved department; sales and marketing, procurement department, and production team. Therefore, in particular dimension T-Test will be used to compare the average mean of the results from the two. Accordingly, T-Test function was selected to adjudicate the differences upon the two average (ABC company and supplier). The hypothesis of the two average is equal will be accepted when P-value is greater than the other by 1% where the two set of data distribution is presented in normal curve.

This statistical research manner will be performed and interpreted through Microsoft Office: Excel as it is the most optimum software with highly reliable capability. However, there are various statistic accumulation software provided in

the market but due to the funding restraints of both ABC company and the supplier, those exotic computing software were unaffordable.

4.2.3 Demographics Of Respondents

Most of the respondents are female aged between 20-30 with education background from technical school with more than 50%. 55% of the respondents are from sales and marketing department from both the ABC company and the supplier's firm which sales department was directly involved in grafting the information sharing scheme of the transparency model suggested.

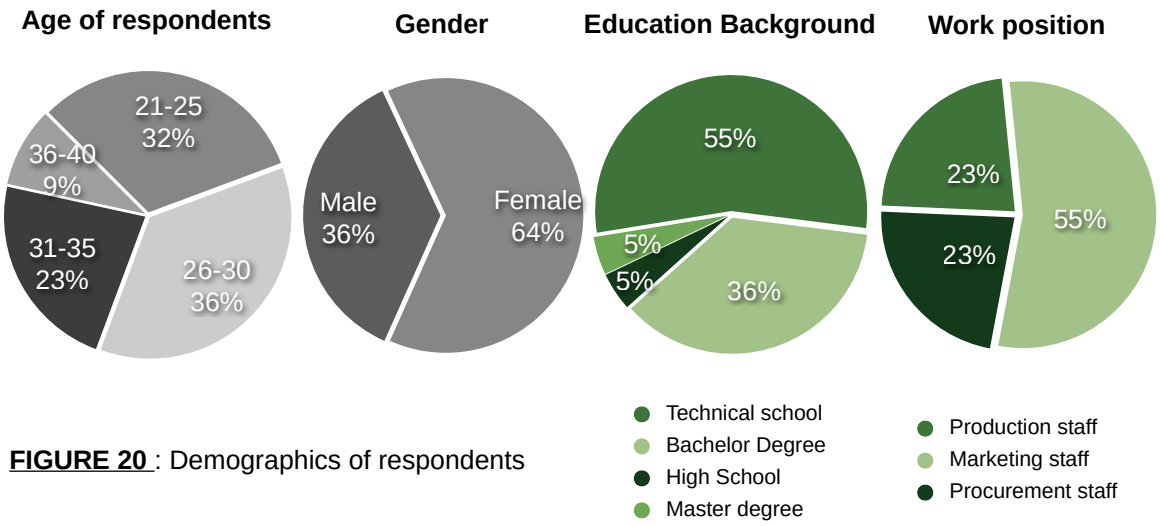


FIGURE 20 : Demographics of respondents

4.2.4 Overall satisfaction regarding the information sharing dimension

The results obtained from ABC company and the supplier did show great differences in many dimension of the information sharing. In average, ABC company's employees were more satisfied with the information sharing scheme more than the supplier's.

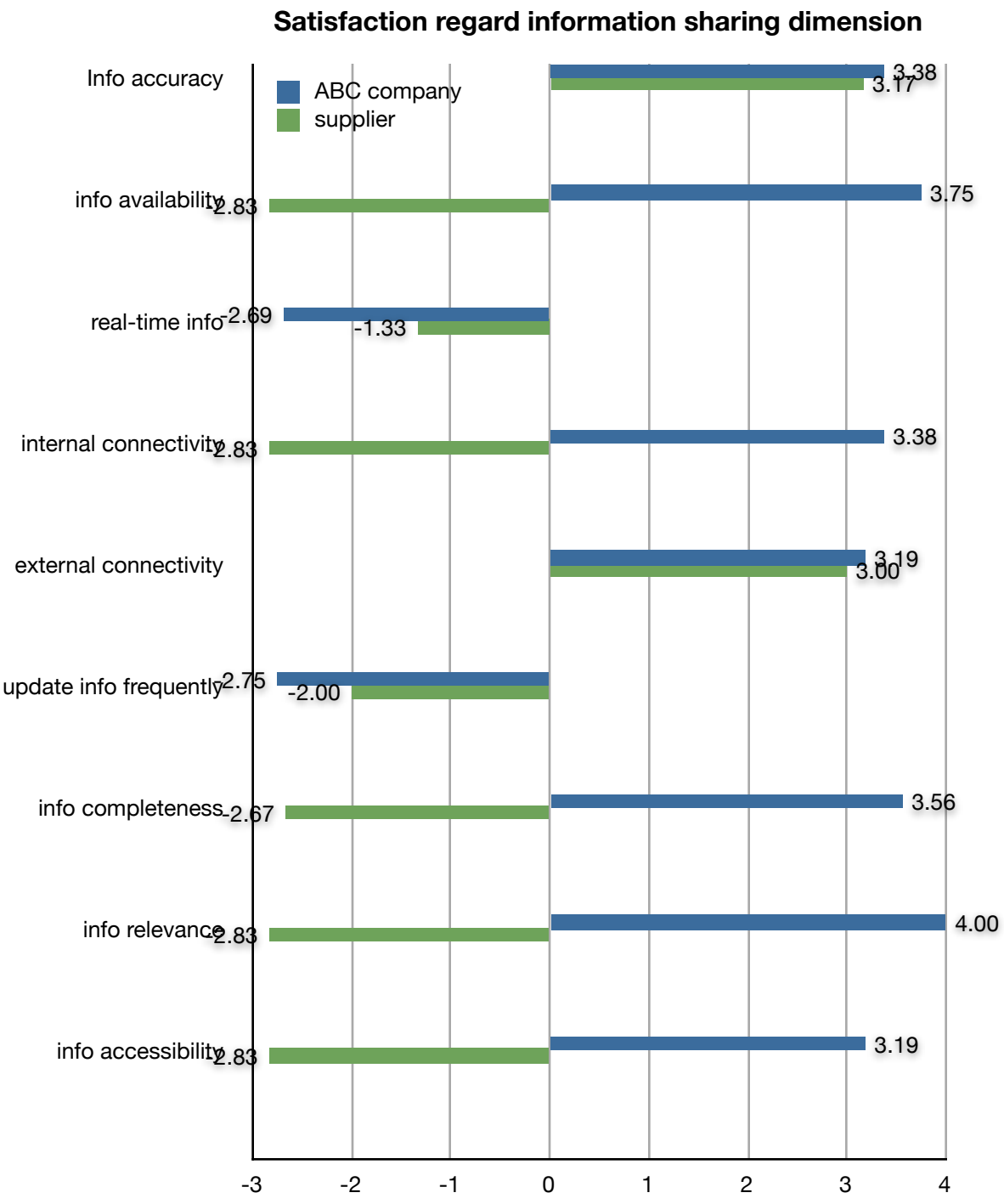


FIGURE 21 : Employees' satisfaction regards information sharing activity

From *Figure 21*, it was proved that the infrastructure of the ABC company is the main factor supporting the information sharing activity. To the extent of infrastructure, the ABC company show higher potential than the suppliers that the ABC company has easier access to source of fund.

However, the infrastructure problem found from both firms have blocked the information sharing activity in many dimensions. It was firmly proved that accessibility of the real-time information has been blocked by the low level of connectivity. Therefore, the information shared were not update frequently as the real-time updating technology do require huge amount of investment capitol which was far beyond focus of both firms. (see the figure illustrated below)

4.2.5 Respondents' perception towards the information sharing dimension

Based on results illustrated in *Figure 22 and Figure 23,* the questionnaires were filled by both employees from ABC company and the supplier represented a very expressive progression. The transparency model through information sharing scheme implanted happened to be satisfied by both firms regarding the perception of the employees. It was showed that both firms performed very well in this initiative steps of information sharing by shared more information with more accuracy and relevance of the data.

Moreover, both firms tend to share the information more often based upon regular basis relevant to the transparency scheme that urge the employees to exchange data on timely manner. In contrast, this transparency model was only grafted only in initiative level, therefore, there was no confidential information had been shared between the firms. According to the questionnaires' results, the employees of both firms did confirm that they did not share any confidential information and was not ready to share any of those at this initiative stage.

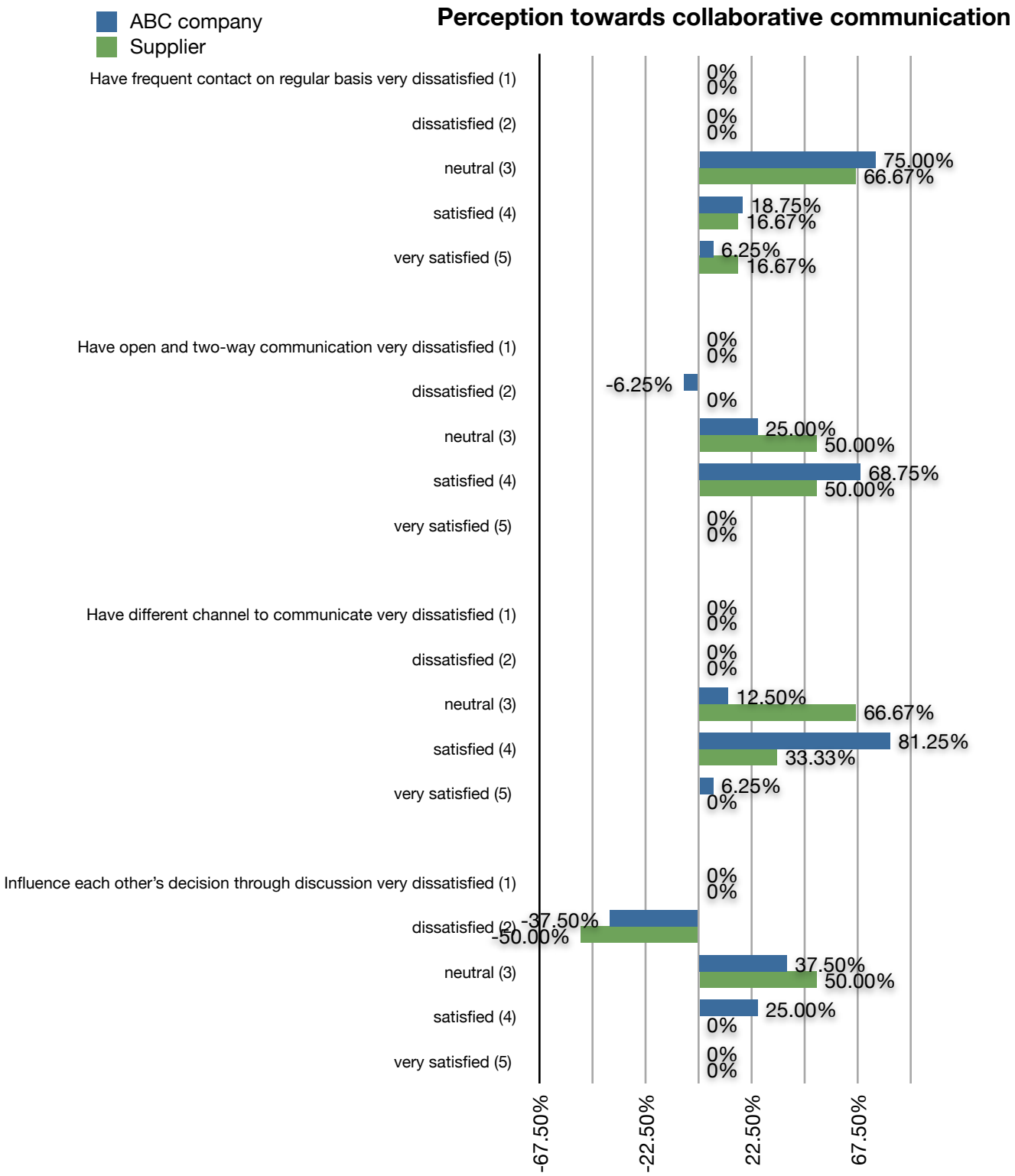


FIGURE 22 : Employees' perception towards collaborative communication

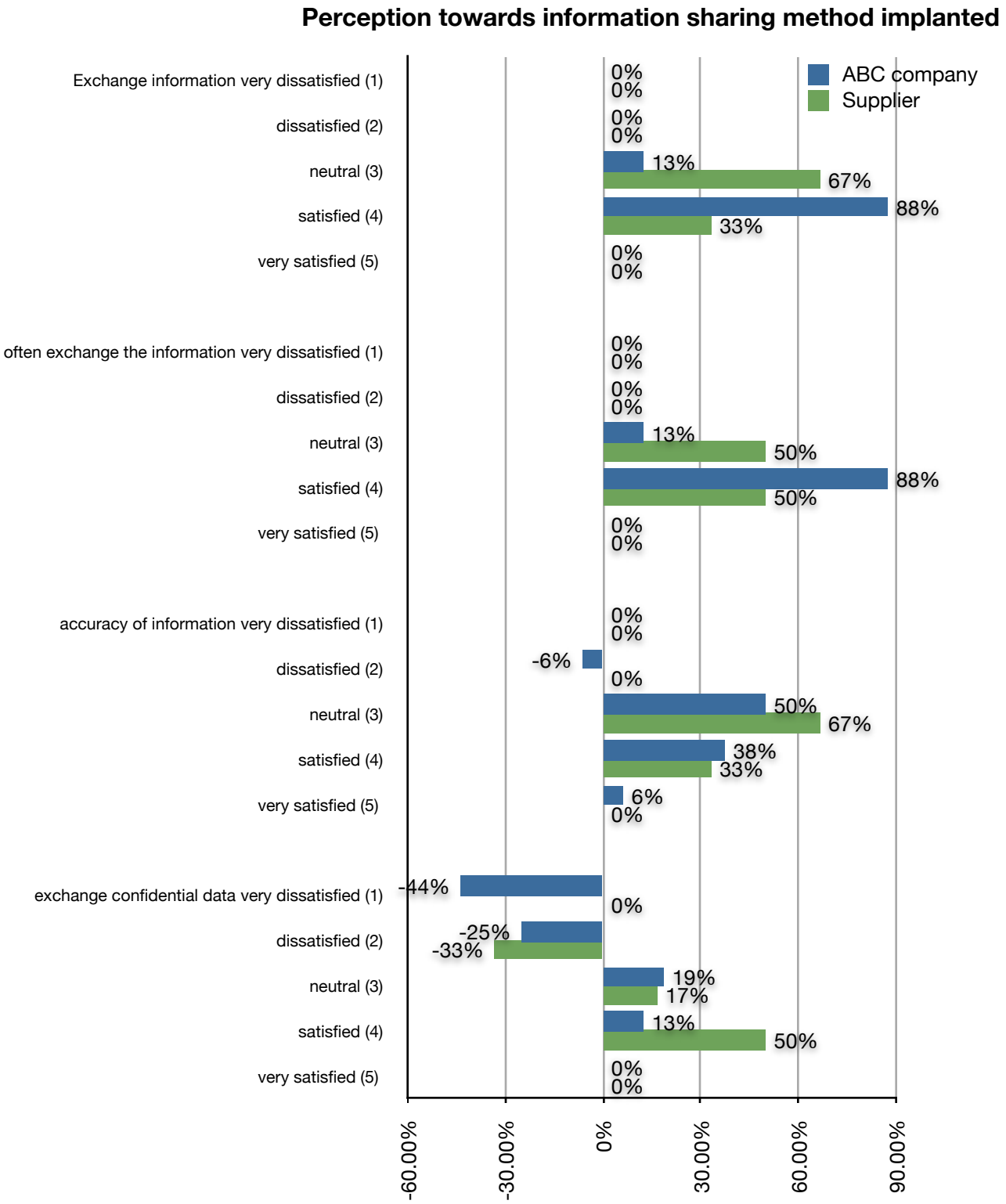


FIGURE 23 : Employees' perception towards information sharing method

4.2.6 Trust and Mutual Collaboration

These two perspectives (trust and mutual collaborations) reflect transparency were described by qualitative research manner such as interviews and questionnaires regarding the fact that these emotional perspective are very intangible and abstract. From the transparency model procedure, the employees from both the ABC company and packaging suppliers were indirectly forced to perform more and jointly together. The process itself included data sharing through different techniques which the employees have to responsively collaborate to the other's requests.

These data sharing method was not only enhance the process efficiency but also enhance the relationship between the ABC company and the supplier by higher level of trust and empathy has been observed among the focused employees. It was a good sign that both the ABC company and the suppliers can performed better collaboration while keep rocketing it's own trustworthiness.

However, it was noticed since the very beginning of the transparency model launched, most of the employees had felt resisted to changes occurred in their work procedure. It is understandable that people are often reject to any change especially in Thai workers. Through the Thai working culture and nature, it was reasonable enough to understand why Thai worker had imposed in such refraining way. From the interviews with the employees, most of them said that the new transparency model implanted had put much work loaded on their responsibility which it might be the main theme of all the excuses and rejecting behavior spotted in the very beginning of the trial.

To subside the problems found, the more proper incentive policy had been a very quirky solution. The higher and better incentive and benefits had been proposed to motivate the employees to collaborate with the new work model. The extra overtime payment had been given out to any employees that have to perform more work load as well as the incentive for external supplier's site visit.

The commission percentage of any profit gain was another incentive alignment policy to motivate the employees by which any profit gain and cost-reduction saved will be given to every employees in order to bring out the best of the employees' performance.

After the transparency model had been performed, there was another employees' interview acquiring whether the employees as satisfied with the new model or not. The results showed that the employees satisfied and accepted the alteration of the process procedure through the transparency model suggested. This could be the biggest improvement of the ABC company's supply chain by seized the win-win situation through gaining higher profit, reducing the cost, and keep the employee's work satisfaction.

Unfortunately that the incentives alignment policy can only be infused into the ABC company's side only. The packaging supplier's incentive policy was far beyond our control as this research own no right to alter and change to the supplier's incentive alignment. Therefore, this can possibly led the packaging suppliers to cope with conflicts from the own workforce. Regardless of the ABC company's employees, the supplier's workforce were pressurized to perform better with more often of paper work (according to the information sharing scheme) which most of the supplier's workforce were unwilling to do unless there are better incentives and benefits in return of doing so.

It was beyond reach to control over the supplier's managing policy, therefore, there is no quarantine to ensure that the supplier's workforce will satisfy with the new roadmap or not. However, the work load that had been put on top of the normal working routine was not difficult that the supplier might not encounter with any major rejection but only the minor one. Moreover, both ABC company employees and the supplier's workforce had claimed in a landslide that the new workflow had made them communicated more either by data transaction or perceived other's sentiments. By knowing each other's sentiment from any business requests, the employees had experienced that first-handed

understanding of being pressured under tough negotiation which was not only increasing the empathy and trust but also trained the employees to do each request tenderly.

CHAPTER V
Conclusion and Discussion

From both quantitative and qualitative results obtained from previous chapter, it was strongly confirmed that both firms has been shared their information at initiative level. It was also found that the firm and supplier were willing to share more in the future regardless of the fact that both of them had shared only fundamental data at this current stage where the confidential insights still kept opaque.

From concretely quantitative results, the mutual benefits gain by both firms were the scrap rate that was reduced down by **25.81%** (**4.5mTHB saved**). On the other hand, this lessen waste level can be referred back to supplier's waste level as well which was considered 'mutual benefits' of implementing transparency.

Prior to the transparency model had been initiated, there were uncertainty in inventory levels of both ABC company and the supplier through the 'bullwhip' effect which was the nature of market and risk management protocol. The bullwhip had caused the inventory to exceed the reality by almost **30.19%** of the actual production level. This exceeding inventory levels do come with the cost as high as **44mTHB per year** just to balance the risk of raw-material shortage along the production line started.

To the extent of this bullwhip effect upon the inventory level, the suppliers are also suffocated by this uncertainty as well which they had to double the raw-material of making the packaging ordered. As a results, the transparency scheme grafted can deduced this bullwhip effect down through data sharing application as well as trust built along the processes of implementation. It had been proved that the inventory level of the ABC company had been increased down by almost **15%** or **6.38mTHB was saved** by the reduction of inventory level to be as close as the actual demand and production.

However, the secretiveness manner of both firms were that they did not underpin how importance the mutual collaboration was as well as the deficiency of the technology platform regarding the difficulties in funding access. The absence of advanced information technology might have been the major drawback that it blocked the relationship and trust to emerge. Unfortunately, investing in exotic technology infrastructure usually cost heavy amount of investment which is far from possible in SMEs scale.

From the funding restraints of the firms, this initiative step of implementing transparency model was designed to leverage its benefits at minimum investment by deployed the scheme with current technology platform. At the very beginning of the implementing process, trust was adopted at very limited level (Quadrant I in the figure illustrated below). Both firms were reluctantly shared it's own information according to the most nature of human-being. Human natural reflect will automatically rejecting to share any disclose information to others as there are no assurance of using those shared information responsibly; we, human, mostly afraid of what we don't know.

The alarm that triggered distrust to emerge is the intimidate of the confidential information leakage. Confidential leakage might jeopardized the firms with many mutilations by opponent or anyone. Precisely, the first issue to consider is not selecting which application should be used to share the information but how to use those information responsibly as well as to make oneself trustworthy enough for the other to trust.

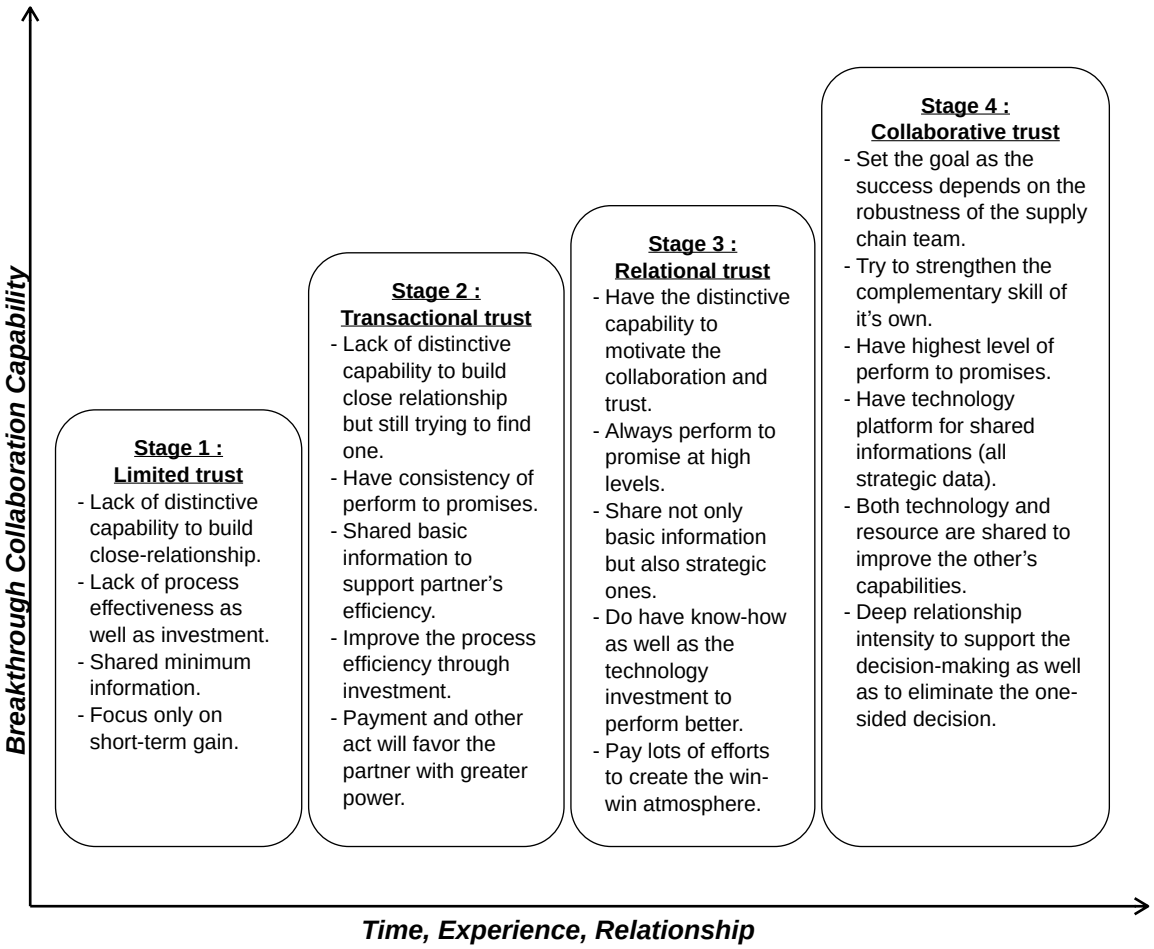


Figure 24 : Trust maturity framework
SOURCE : (S.E. Fawcett et al. 2012) Supply chain trust : The

Referred to *Figure 24*, qualitative results obtained from intense observations and interviews had determined that each firm's employees showed higher level of trust upon each other. Currently, the trust commitment level was moving from Quadrant I (limited trust) towards Quadrant III (commitment-based trust) where both firms desired for strategic relationship through longer business term.

This commitment-based trust can be implied that the performance of both firms has achieved higher efficiency while there were still some waste and scrap errors found but with decreasing pace. In contrary, these scrap and errors were

the initiative step of trust-violation which can led to many negative effects in the future only if there were no strategic improvement of those flaws. According to the interviews, the employees had strongly confirmed that the others had made them performed better through work confidently and enthusiastically. Clearly that trust is the core-driven factor of performance improvement and work satisfaction levels, in this case, through the transparency framework implemented.

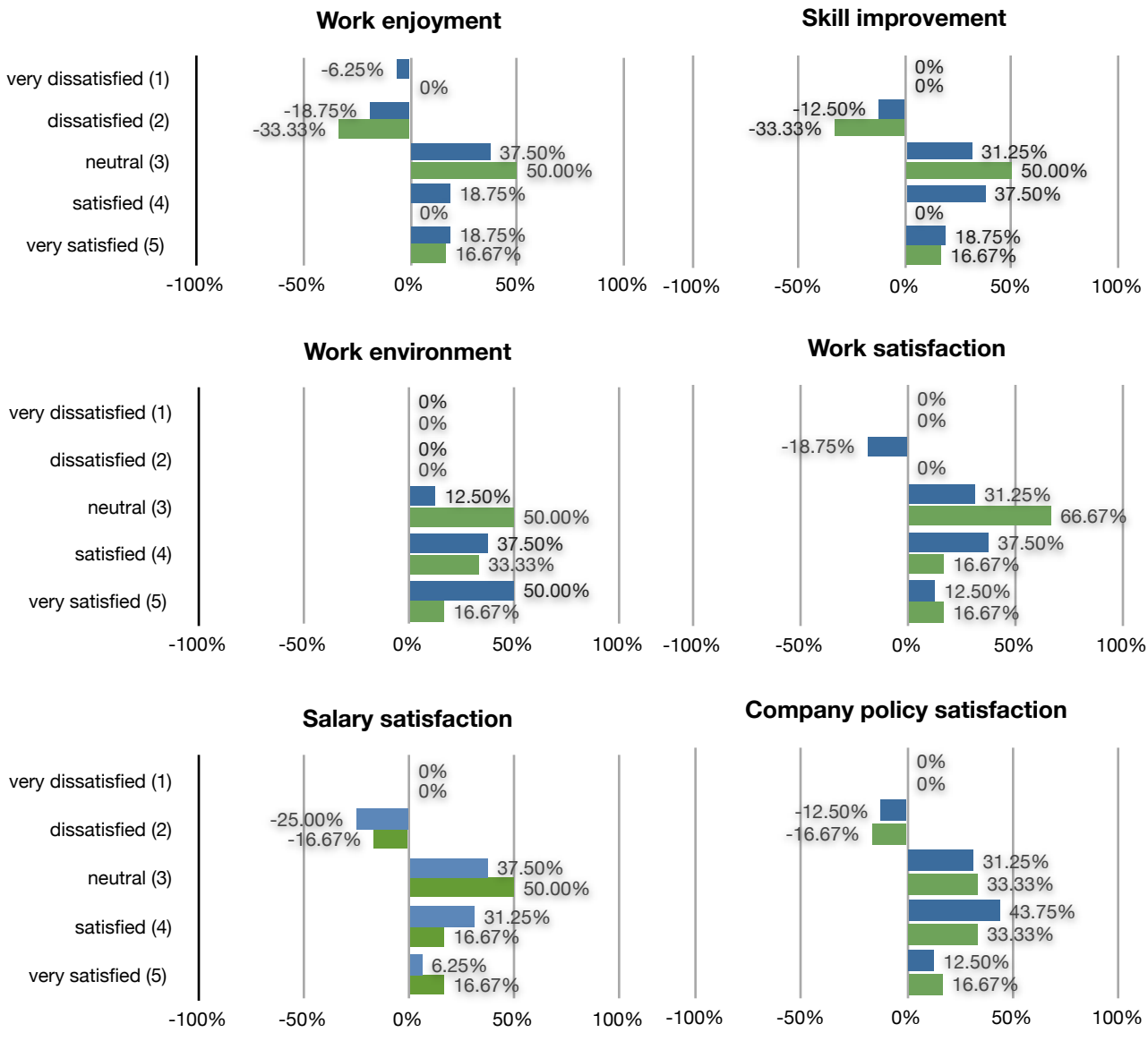


FIGURE 25 : Employees' overall work satisfaction levels

On the other hand, the flaws of the proposed framework was that the incentive alignment of the supplier's staff is uncontrollable. The supplier's staff might have felt the more workload required them to perform while their rewards system was not established yet. From *Figure 25,* this perspective of work satisfaction and commitment level towards reward system were described in such qualitative manner through questionnaires. The survey results verified that supplier's staff had showed less satisfaction level than the ABC company which has proved the hypothesis stated above.

a. Work Enjoyment

The average point of ABC company's employees was at 3.25 out of 5 while the supplier's at 3. It can be implied that working environment at ABC company is more suitable as well as the incentives policy.

b. Work environment

According to work enjoyment assumption, ABC company have an average point at 4.375 while supplier had only 3.667. This was proved that working environment is affected the employee's commitment level.

c. Work satisfaction

However, in work satisfaction dimension, supplier scored an average point at 3.5 while the ABC company's at 3.4375 which was slightly different. Showing that both ABC company and the supplier were compromised with the results of their work. Both firms might have felt that they can do better to get better work result.

d. Skill improvement

ABC company got higher average score upon this topic than the supplier's employees. This can indicated that ABC company's employees tend to improve their working skills to be promoted or get higher salary.

e. Salary satisfaction

According to the statement mentioned earlier that ABC company's employees tended to improve their working skill just to be promoted and get higher salary. Salary satisfaction of the ABC company got lower average than the suppliers' proving that the hypothesis set was true.

f. Company policy satisfaction

Both ABC company and the supplier show little differences in the average score towards the company policy dimension. Most of the respondents mentioned that their firm's policy are understandable regardless of how dissatisfied of their salary rate and work load.

5.1 The Next Level Of Further Implementing Transparency And Strengthen Long-term Relationship

There are variety of techniques used in strengthen long-term relationship with business partner regarding the different level of relationship and business expertise. Similarity in business background and core-competencies can hi-light the overall performance and relationship between the firm and it's partner. Sharing benefit can also strengthen the relationship by recognizing the other association through the business contribution of the partners (C.S. Tang 1999). Uniqueness of the contribution either from the partner or from within the firm can lead both of them to seize the business opportunities by being responsive to the market change and demand.

Positively communication is one of the positive factors for the firm to build strategic relationship, proper communication can help support both the firm and business partners to listen more and acknowledge the differences of perspective of each other. Admitting and understand the other's different point-of-view can benefit the partnership towards problem solving function through the business' term. Apart from admitting the other differences, shared strength between partnership is vital. Being responsive to the other's need and provide effective support and resource can be one of the the technique in building an effective partnership.

However, it was undeniable that in any relationship comes with conflicts which good conflict management skill can be critically required to build an effective partnership in longer term. To diminish the conflicts found, goal congruence and decision synchronization are very important to ease out those disagreement. Another technique to support and unify both firms is through language and non-verbal language as body gesture and other anthropology science.

Emphasis more on the mutual goal can also help both firms to be unified more easily as well as to build more trust. Mutual goal means to shared both risks and benefits across the system rather than focused on the individual's goal. In addition, the interpersonal skills of human resource hold inside the company is also important. The interpersonal skills of the key player in specific tasks can bring the systems together in a very supportive and collaborative manner. Interpersonal skills can be reflected on many different perspective such as didactic supervision, role-modeling method, and individual's experience and real-life background.

Good interpersonal skill can each individual to facilitate his/her own self-development which can lead to another bigger steps as building good relationship with business partner. Interpersonal skills can be one of the tools

building the competencies by it helps create the systematic goal to ultimately meet the need of customers through first-handed experience.

5.2 Further Research

Learning from this current research, the transparency model deployed regarded the information sharing scheme did show a good positive sign for organizational transformation. The quantitative results had exposed the improvement of both the employees' behavioral that directly affected on the process efficiency as well as the profit gained. However, this research provided only the initiative level of transparency implementation which has blocked with it's own limitations. The incentives and benefits subsidization was given to only the ABC company's employees which technically was unfair to the supplier's employees as they have to work with higher work load as well. Therefore, in further research, the subsidization policy should be addressed for the employee's benefits to be fairly treat.

In further step of implementing transparency, both firms should focus more on benefits and risks sharing after trust was built in the current stage. Benefits and risks sharing will strengthen the longer term of partnership as well as the mutual collaboration among the two. Technological sharing and resource allocation are also needed to be grafted into the next level as these features are the heart of transparency behavior and mutual collaboration. As the results had been stated, these findings still be beneficial for further research and study to improve all the flaws found of this proposed model. Longer time-frame of implementing transparency model should provide broader view of the scheme in order to 360 degree of constraints analysis.

5.3 Conclusion

Conclusively, there is possibility in infusing transparency behavior in to up-stream supply chain of SMEs scale entrepreneurship as it was proven by those quantitative research manners. However, it will only be possible under the proper customization of the suggested model to be most fit with the organization's culture where uniqueness is subjective. Even-though the proposed transparency model had study only at the initiative steps, the findings obtained still exposed with progression of transparency possibility. The model embarked into the current system might not be the best model deployed but it was assumed to be the most optimum one under given many business constraints.

The small scale of business entrepreneurship of ABC company and the packaging suppliers had been the major blockage to experiment with other alternative method of improving the supply chain and inventory management. The low accessibility to source of fund and investment ability were harden the choices of process reengineering that optimum model was the only choice left. The quest to most optimum process alteration was designed to be at minimum investment and robust in most simplicity. The path selection of this research has been proved that it was possible to do so in such a small scale enterprise, in particular, in this initiative steps. Still, there were many constraints and physical challenges that have to be conquered in longer time-frame of business term.

In summary, this research has presented an application of transparency model through information sharing activities of the small scale enterprise under given constraints and different business environment. The results provided were from trials and errors experimental stage regard the proposed model implementation. In additional, selecting the right method and process pipeline can help the firm to leverage more on achieving competitive edge as well as to improved overall process efficiency. The better process efficiency obtained from the proposed model through many dimensions of tangible benefits; cost

reduction, scrap and waste reduction, better inventory management, lead-time reduction, and improved quality dimension.

The suggested conceptual model towards transparency can be grafted into many other perspective of the organization as well as to strengthen the relationship between partners. Along the model implementation process, business partners can develop new work-flow of it's own which can lead to positive effect to partner's process efficiency. This transparency mole is also offering the insight information via two-way communication that allow each other to co-evaluate one another's performance indirectly while maintaining good relationship.

It is conceivably that this transparency model can be configured and developed to achieve higher transparency behavior through many different levels of relationship and trust level achieved. Requisitely, source of fund and investment capability of the firm still remain the all-time challenge to bring transparency into real world practice. Regardless of the funding obstacles, this sparse challenge of implementing transparency was left presented the elucidation of the opportunity for any researcher to participate in taking this issue into further steps.

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Appendix A : Company fact sheet

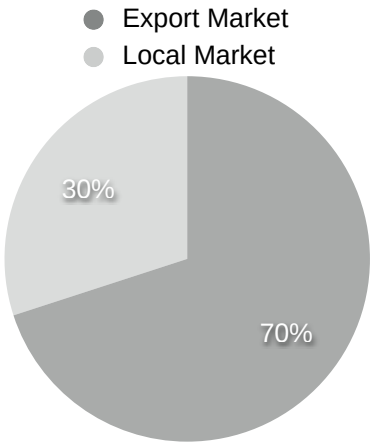
Name of establishment : ALFREDO ENTERPRISE CO., LTD.

Address : Rojana Industrial Park, U-Thai, Ayutthaya, THAILAND

Total Land Area : 12,800 m^2

Total Built-In Area : 5,056 m^2

Type of manufacturing products : Frozen baked products (mainly pizza with variety of topping) which packed in contemporary packaging with easy to handle mode and design.



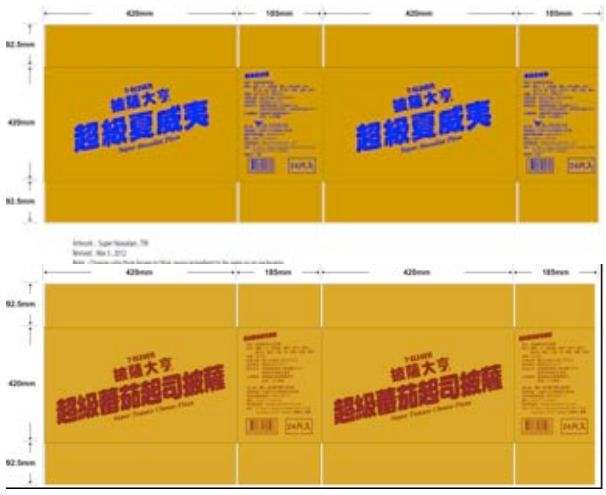
Domestic market : Domestic market throughout the biggest convenient store 7-11 nationwide, supermarket and hypermarket, and department store.

Overseas market : Taiwan, Japan, Korea, Singapore, and EU nations

Future market : northern america, China, Australia and middle east countries

Appendix B : Product portfolio

Product Type	Inner Packaging	Outer Packaging
Frozen Pizza Slice - Triangle Shape - 54 pcs/green basket - 33 pcs/orange basket - Shelf life = 10 days chilled, 1 year frozen		
Frozen Bread roll filled with chicken sausage - bread roll with sausage stuffing - Packed 12 cps/ carton - Shelf life 10 days chilled 1 year frozen		
Frozen Cheese stick in bar shape - Cheese stick in bar shape with breadcrumb - 10 pcs/PE bag/1 pkg - 12 pkg/1 carton		

Product Type	Inner Packaging	Outer Packaging
<u>Frozen 9” Pizza (for Tesco)</u> - Circle shape 9” diameter - 1 pcs/PE bag/ 1 pkg - 12 pkg/1 carton - Shelf-life = 10 days chilled and 1 year frozen		
<u>Frozen 9” Pizza (for MAKRO)</u> - Circle shape 9” diameter - 1 pcs/PE bag - 3 PE bag/ 1 pkg - 6 pkg/1 carton - Shelf-life = 10 days chilled and 1 year frozen		
<u>Frozen Pizza Slice (Export to Taiwan)</u> - Triangle shape - 1 pcs/pkg - 24 pkg/1 carton - Shelf-life = 10 days chilled and 1 year frozen		

Product Type	Inner Packaging	Outer Packaging
Frozen Pizza Bar (Export to Singapore) - Rectangular shape - 1 pcs/PE bag/ 1 pkg - 24 pkg/1 carton - Shelf-life = 10 days chilled and 1 year frozen		
Frozen Pizza Slice (Export to Japan) - Triangle shape - 1 pcs/PE bag/ 1 pkg - 12 pkg/1 carton - Shelf-life = 1 year frozen		
Frozen Oven Pack Pizza Bar - Rectangular shape - 1 pcs/PE bag - 60 PE bags/pkg - 1 pkg/carton - Shelf-life = 10 days chilled and 1 year frozen		

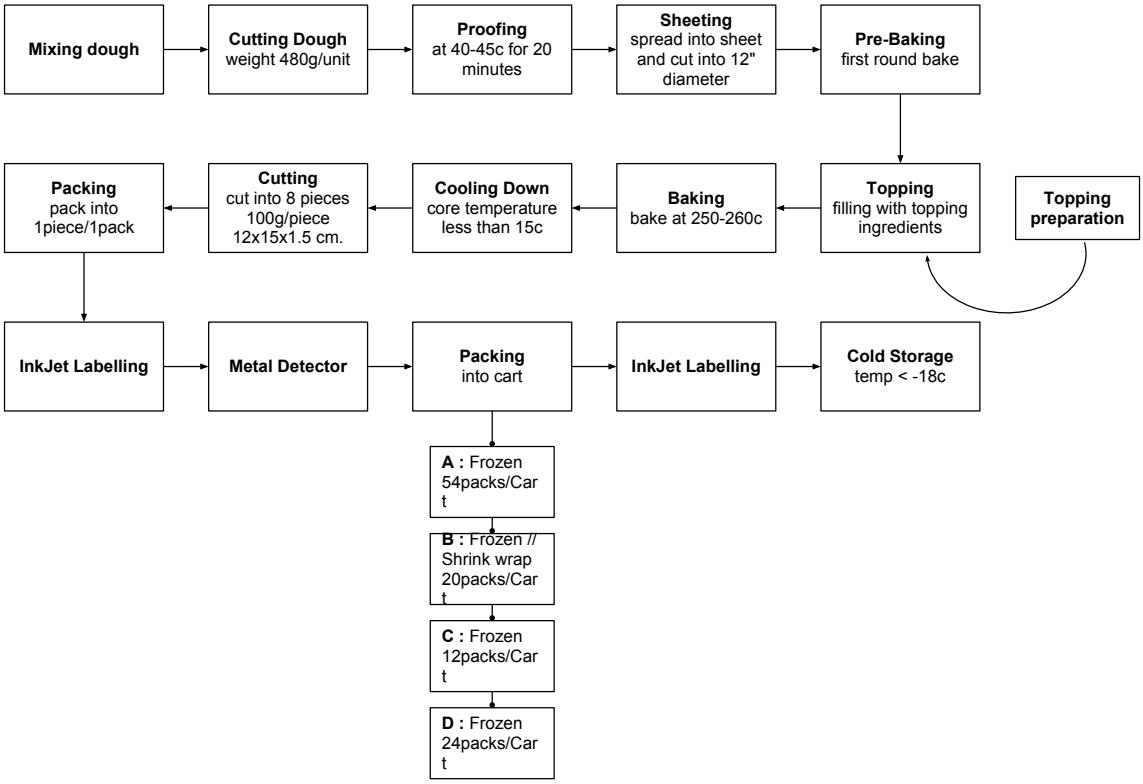
Product Type	Inner Packaging	Outer Packaging
<u>Frozen Hot Sandwiches (for Airline catering)</u> - Half moon shaped - PE box packaging - 1pcs/PE box (inner = PE bag) - 60 PE box/pkg - 1 pkg/carton - Shelf-life = 10 days chilled and 1 year frozen		
<u>Frozen Mini Pizza Slice in PE pack (export to Netherlands)</u> - Triangle shape - 6 pcs/pkg. - 24 pkg./carton - Shelf-life = 10 days chilled and 1 year frozen		

Product Type	Inner Packaging	Outer Packaging
<u>Frozen Pizza Snack (export to Netherlands)</u> - Rectangular shape - 1 pcs/pkg. - 12 pkg./carton - Shelf-life = 10 days chilled and 1 year frozen		
<u>Frozen Hot sandwiches (for customized catering)</u> - Half moon shape - PE box packaging - 1 pcs/PE box (inner=PE bag) - 60 PE bag/pkg. - 1 pkg./carton - Shelf-life = 10 days chilled and 1 year frozen		

Appendix C : Main packaging supplier

Main Packaging Suppliers				
Supplier	*Type of raw material*	*Address*	*Delivery*	*Lead-time*
Continental Packaging (Thailand) Co., Ltd.	Specific shape box (inner package)	90 / 3 Soi Sukhumvit 31 (Swasdee),Sukhumvit Rd. Klongton-nua Bangkok	Truck	20 Days
Best Box Co., Ltd.	Paper carton box (outer package)	12/46-47 Moo7 Eka-Chai Rd.,Soi Siri-U-Vitaya, Bangbon , Bangkok	Truck	25 Days
Thai Paco Printing Co., Ltd.	Specific shape box (inner package)	66/76 ตรอกนอกเขต ถ.นนทรี ช่องนนทรี ยานนาวา กรุงเทพฯ	Truck	10 Days
Pan Asia Commercial Co., Ltd.	PE bag (inner package)	66/76 ตรอกนอกเขต ถ.นนทรี ช่องนนทรี ยานนาวา กรุงเทพฯ	Truck	10 Days

Appendix D : Production process flow



Appendix E : Company procurement policy

	ประเภทเอกสาร	ระเบียบปฏิบัติ	Document No.	PR-PU-001
			Revision No.	09
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1. วัตถุประสงค์

เพื่อให้ได้วัตถุดิบ บรรจุภัณฑ์ วัสดุสิ้นเปลืองโรงงาน และงานบริการต่างๆ ที่มีคุณภาพตามข้อกำหนด และเป็นไปตามความต้องการของบริษัท

2. ขอบข่าย

การจัดซื้อวัตถุดิบ บรรจุภัณฑ์ วัสดุสิ้นเปลืองโรงงาน และงานบริการต่างๆ ที่มีผลกระทบกับคุณภาพและความปลอดภัยของผลิตภัณฑ์

3. นิยาม

ใบ PR = (PURCHASE REQUESTION) ใบเสนอซื้อ

ใบ PO = (PURCHASE ORDER) ใบสั่งซื้อ

Supplier = ผู้ขาย , ผู้ส่งมอบ

Quotation = ใบเสนอราคา

4. หน้าที่ความรับผิดชอบ

4.1 พนักงานจัดซื้อ

4.2 ผู้จัดการแผนกจัดซื้อ

5. เนื้อหา

5.1 การเขียนใบ PR หน่วยงานที่ขอซื้อ วัสดุสิ้นเปลืองทั่วไป งานบริการ วัสดุ อุปกรณ์ ฯลฯ โดยผู้เขียนจะเป็นผู้ใดในหน่วยงานก็ได้ ซึ่งจะต้องเป็นผู้รับผิดชอบกำหนดข้อมูลการจัดซื้อ ไว้ในใบ PR (FM-PU-004) แล้วนำไปเสนอให้ผู้ตรวจสอบ ผู้อนุมัติ และผู้รับลงนามดังนี้

5.1.1 ผู้สนอซื้อจะต้องกำหนดข้อมูลการจัดซื้อ ดังต่อไปนี้ไว้ในใบ PR (FM-PU-004)

- วัสดุหรือบริการที่ต้องการ
- จำนวน
- กำหนดส่งมอบ หรือกำหนดการบริการ (ถ้ามี)
- ข้อกำหนดคุณภาพ (ถ้ามี)

ข้อกำหนดคุณภาพ อาจจะระบุข้อกำหนดคุณภาพในใบเสนอซื้อ หรืออ้างอิงเอกสารที่ระบุข้อกำหนดคุณภาพ หรือจัดทำข้อกำหนดคุณภาพไว้เป็นเอกสารแนบมาก็ได้ เช่น Quotation , เกณฑ์มาตรฐานสินค้า

5.1.2 ขั้นตอนการลงนามในใบ PR PR (FM-PU-004)

ราคา	ผู้ตรวจสอบ	ผู้อนุมัติ	ผู้รับ
ไม่เกิน 1,000 บาท	หัวหน้างานขึ้นไป	ผู้จัดการ	พนักงานจัดซื้อ
1,000 - 5,000 บาท	หัวหน้างานขึ้นไป	ผู้จัดการแผนกบัญชี	พนักงานจัดซื้อ
5,000 บาทขึ้นไป	หัวหน้างานขึ้นไป	ตำแหน่ง Senior Executive Director ขึ้นไป	พนักงานจัดซื้อ

5.1.3 ขั้นตอนการขออนุมัติซื้อในกรณีเร่งด่วน

ถ้าผู้เซ็นต์อนุมัติในระดับต่างๆไม่อยู่ ให้ผู้ที่มีอำนาจเซ็นต์อนุมัติสูงกว่า เป็นผู้เซ็นต์อนุมัติแทน หรือถ้าไม่มีผู้ใดอยู่ในบริษัทเลย ให้ใช้วิธีโทรแจ้งเพื่อขออนุมัติทางโทรศัพท์ และนำใบ PR ที่ได้รับการอนุมัติทางโทรศัพท์แล้วมาเซ็นต์ย้อนหลัง

หมายเหตุ ยกเว้น วัตถุดิบ บรรจุภัณฑ์ และ วัสดุสิ้นเปลืองในโรงงาน ที่ไม่ต้องเขียนใบ PR เนื่องจากมีหลายรายการและเป็นสิ่งที่ต้องใช้อยู่เป็นประจำ ดังนั้นพนักงานจัดซื้อจะทำการสั่งซื้อโดยอัตโนมัติ โดยจะคำนวนสั่งซื้อ วัตถุดิบและบรรจุภัณฑ์ จากแผนผลิต MONTHLY PRODUCTION PLAN (FM-PD-025) ส่วนวัสดุสิ้นเปลือง จะดูจากรายงานวัสดุสิ้นเปลืองประจำวันของแผนกสโตร์ และพนักงานจัดซื้อจะคำนวนการใช้งาน แล้วสั่งซื้อโดยอัตโนมัติ

5.2 เมื่อมีการอนุมัติใบ PR (FM-PU-004) แล้ว พนักงานจัดซื้อทำการตรวจสอบความถูกต้องแล้วลงนามในช่องผู้รับ และดำเนินการตามขั้นตอนดังนี้

- ตรวจสอบความถูกต้องของใบ PR (FM-PU-004) ว่าผู้เสนอซื้อระบุรายละเอียดมาครบถ้วนหรือไม่
- ในใบ PR (FM-PU-004) ต้องมีผู้ลงนามครบทุกช่อง คือ ผู้เสนอ ผู้ตรวจสอบ ผู้อนุมัติ และผู้รับ
- พนักงานจัดซื้อ เลือก Supplier จากทะเบียนผู้ขาย ติดต่อ Supplier เพื่อกำหนดรายละเอียดด้านราคา และกำหนดการส่งมอบที่เป็นไปได้
- ในกรณีที่เป็น Supplier รายใหม่จะต้องดำเนินการตามนี้

1. ประเมินและบันทึกการคัดเลือก Supplier กลุ่มที่เป็นวัตถุดิบ ใน VENDOR SELECTION RECORD (FM-PU-003) โดยมีหลักเกณฑ์และเกณฑ์การประเมินคัดเลือกผู้ขายดังนี้

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หลักเกณฑ์การประเมินคัดเลือกผู้ขายคิดคะแนนเต็ม 100 % ดังนี้

1. ประเมินโดยแผนกวิจัยและพัฒนาผลิตภัณฑ์ (คิดคะแนนเต็มเป็นร้อยละ 70 %)

โดยมีการประเมินและบันทึกลงตามแบบฟอร์มการประเมินความเสี่ยงที่มีผลต่อด้านคุณภาพและความปลอดภัยของวัตถุดิบ (FM-RD-016) พิจารณาจากแบบฟอร์มสอบถามความเสี่ยงต่อการปนเปื้อนที่มีผลกระทบต่อด้านคุณภาพและความปลอดภัย (FM-RD-006) และเอกสารอื่นๆที่ได้รับจากผู้ขาย

2. ประเมินโดยแผนกจัดซื้อ (คิดคะแนนเต็มเป็นร้อยละ 30%)

โดยมีหลักเกณฑ์ประเมินตามขั้นตอนการปฏิบัติงาน VENDOR SELECTION RECORD (WI-PU-001) และใช้แบบฟอร์มการคัดเลือกผู้ขาย (FM-PU-007) ในการประเมิน โดยมีหัวข้อดังนี้

1. มีความพร้อมในการขนส่ง
2. มีความพร้อมด้านกำลังการผลิตของผู้ขาย
3. มีราคาเหมาะสม

โดยนำคะแนนที่ได้ในส่วนของการประเมินโดยแผนกวิจัยและพัฒนาผลิตภัณฑ์คิดเป็นคะแนนเต็มร้อยละ 70% และการประเมินโดยแผนกจัดซื้อคิดเป็นคะแนนเต็มร้อยละ 30% มารวมกัน และจัดแบ่งผู้ขายเป็นกลุ่มความเสี่ยง ดังนี้

- ได้คะแนน 60 - 70 % จัดเป็นกลุ่มที่มีความเสี่ยงสูง
- ได้คะแนน 71 – 85% จัดเป็นกลุ่มที่มีความเสี่ยงกลาง
- ได้คะแนน 86 – 100% จัดเป็นกลุ่มที่มีความเสี่ยงต่ำ

*** ถ้าคะแนนน้อยกว่า 60 % ถือว่าไม่ผ่านเกณฑ์การคัดเลือกผู้ขาย ***

2. กรณีผ่านเกณฑ์การประเมินคัดเลือกผู้ขายให้นำมาขึ้นทะเบียนผู้ขาย APPROVED VENDOR LIST (FM-PU-001) กรณีไม่ผ่านเกณฑ์จะไม่นำมาขึ้นทะเบียนผู้ขาย

3. นำผลสรุปการประเมินผู้ขายมาจัดทำเป็นเกณฑ์กำหนดการตรวจประเมินผู้ขาย ดังต่อไปนี้

3.1 กลุ่มที่มีความเสี่ยงสูง ตรวจประเมินผู้ขายปีละ 1 ครั้ง

3.2 กลุ่มที่มีความเสี่ยงกลาง ตรวจประเมินผู้ขายทุก 2 ปี

3.3 กลุ่มที่มีความเสี่ยงต่ำ ตรวจประเมินผู้ขายตามความเหมาะสมหรือดูจากเอกสารการควบคุมความเสี่ยงต่อการปนเปื้อน ที่มีผลกระทบทางด้านคุณภาพและความปลอดภัย , ใบรายงานผลการวิเคราะห์ COA , Test Report ประจำปี , ระบบคุณภาพ และการรับรองการผลิต จากระบบต่างๆ เช่น GMP, HACCP , BRC / IFS , ISO 9001 , ISO 14001 , HALAL , KOSHER เป็นต้น

5.3 พนักงานจัดซื้อเปิดใบ PO (FM-PU-005) โดยกำหนด ชื่อบริษัทของผู้จำหน่าย เลขที่ใบสั่งซื้อ วันที่สั่งซื้อ วันที่รับของ รหัสสินค้า / รายละเอียด จำนวน ราคาต่อหน่วย พิมพ์ต้นฉบับ 1 ใบ เก็บไว้ที่แผนกจัดซื้อ สำเนา 2 ใบ เพื่อนำไว้แนบใบกำกับภาษี และสำเนา 1 ใบ เก็บไว้ที่แผนกคลังสินค้า แล้วพนักงานจัดซื้อลงนามในช่องผู้สั่งสินค้า ระดับหัวหน้าแผนกจัดซื้อขึ้นไปหรือกรรมการผู้จัดการลงนามในช่องผู้รับมอบอำนาจ เมื่อลงนามครบแล้วจึงส่งแฟกซ์ ไปให้ Supplier

5.4 ในกรณีที่มีการยกเลิกสินค้าที่สั่งซื้อไปแล้ว จะดำเนินการดังนี้ คือ นำต้นฉบับใบ PO (FM-PU-005) ประทับตรา ยกเลิก ด้วยหมึกสีแดงโดยให้พนักงานจัดซื้อ หรือ หัวหน้าแผนกจัดซื้อขึ้นไป ลงนาม และลงวันที่ ที่สั่งยกเลิก กำกับไว้ด้วยแล้วส่งแฟกซ์ ไปให้ Supplier

5.5 ในกรณีที่มีการเปลี่ยนแปลงข้อมูลสินค้า ที่เปิด PO (FM-PU-005) ไปแล้ว พนักงานจัดซื้อจะดำเนินการ แก้ไข PO (FM-PU-005) จากโปรแกรม EXPRESS โดยเข้าไปที่เลข PO (FM-PU-005) เดิม แล้วเปลี่ยนแปลงวันที่จัดส่ง , จำนวน หรือข้อมูลที่ต้องการเปลี่ยนแปลง แล้วระบุหมายเหตุไว้ใน PO (FM-PU-005) ว่ามีการเปลี่ยนแปลงอะไรบ้าง และนำมาประทับตรา REVISED หรือหมายเหตุว่า REVISED แล้วลงชื่อและวันที่แก้ไข ส่งแฟกซ์ไปให้ Supplierใหม่

5.6 เมื่อมีสินค้ามาส่งตามกำหนด แผนกที่เสนอซื้อสินค้าจะทำการตรวจสอบสินค้า และรับสินค้าเอง โดยให้ผู้ที่รับของลงนามในช่องผู้รับสินค้าในเอกสารใบกำกับภาษี

- ในกรณีที่เป็นสินค้าทั่วไป แผนกที่รับสินค้าจะนำใบกำกับภาษีมาให้พนักงานจัดซื้อ แล้วพนักงานจัดซื้อจะนำใบกำกับภาษีมาแนบกับ ใบ PR (FM-PU-004) และสำเนา ใบ PO (FM-PU-005) เพื่อส่งให้แผนกบัญชี
- ในกรณีที่เป็นวัตถุดิบ บรรจุภัณฑ์ และวัสดุสิ้นเปลืองโรงงาน พนักงานจัดซื้อจะนำสำเนาใบ PO (FM-PU-005) ไปให้พนักงานแผนกคลังสินค้า เมื่อมีวัตถุดิบ บรรจุภัณฑ์ และวัสดุสิ้นเปลืองโรงงาน มาส่งพนักงานคลังสินค้าจะลงนามผู้รับสินค้าในใบกำกับภาษี และนำมาแนบสำเนาใบ PO (FM-PU-005) เพื่อส่งให้แผนกบัญชี

5.7 การควบคุมคุณภาพของผู้ส่งมอบ

5.7.1 พนักงานจัดซื้อ หรือระดับหัวหน้าแผนกจัดซื้อขึ้นไป รับผิดชอบประเมินผลงานของ ผู้ส่งมอบวัตถุดิบ บรรจุภัณฑ์ วัสดุสิ้นเปลือง งานอื่นๆทั่วไป โดยจัดให้มีการประเมินผู้ขาย (Supplier) (FM-PU-006) รอบการประเมิน คือ เดือน มกราคม ถึง เดือนธันวาคม ของทุกปี โดยให้มีการประเมิน ปีละ 1 ครั้ง

โดยมีหัวข้อในการประเมิน Supplier ดังนี้

ทันฉบับ

- สภาพทั่วไป / ราคา
- การบริการ
- การส่งมอบ
- คุณภาพ

หมายเหตุ ถ้าเป็นการประเมินผู้ขายประเภทงานบริการ จะเปลี่ยนหัวข้อในการประเมินจากเรื่อง "สภาพทั่วไป" เป็นเรื่อง "ราคา" แทน เพื่อความเหมาะสมในการให้คะแนน

5.7.2 การประเมินผู้ขายประเภทงานบริการจะดำเนินการทำแบบประเมินผลและจัดเก็บโดยแผนกที่ดูแลควบคุมงานบริการนั้นๆดังนี้

- การควบคุมสัตว์พาหะ	ประเมินผลโดย	แผนกประกันคุณภาพ
- การทดสอบห้องปฏิบัติการและการสอบเทียบ	ประเมินผลโดย	แผนกประกันคุณภาพ
- งานซ่อมบำรุง	ประเมินผลโดย	แผนกซ่อมบำรุง
- การขนส่ง และกระจายสินค้า	ประเมินผลโดย	แผนกขายในประเทศและต่างประเทศ
- การจัดการขยะของเสีย	ประเมินผลโดย	แผนกทรัพยากรบุคคล

โดยจะมีการประเมินผลของงานบริการตามแบบฟอร์ม FM-PU-006 ยกเว้น หัวข้องานซ่อมบำรุง ประเมินผลตามแบบฟอร์ม FM-MT-089 ,หัวข้อการขนส่งและกระจายสินค้าประเมินผลตามแบบฟอร์ม FM-SA-008 และหัวข้อการจัดการขยะของเสีย ประเมินผลตามแบบฟอร์ม FM-HR-041

5.8 เกณฑ์การพิจารณาสั่งซื้อเร่งด่วน

5.8.1 กรณีที่เป็นวัตถุดิบขาดสต๊อก

5.8.1.1 พนักงานจัดซื้อประสานงานกับ Supplier เพื่อติดต่อสั่งซื้อวัตถุดิบ เพื่อกำหนดการส่งมอบอย่างเร่งด่วน หากผู้ขายสามารถส่งวัตถุดิบได้ ให้ทำการจัดซื้อตามขั้นตอนการจัดซื้อ (PR-PU-001)

5.8.1.2 ในกรณีที่ Supplier ไม่สามารถส่งสินค้าได้ทัน และบริษัทจำเป็นต้องมีการผลิตอย่างเร่งด่วน ให้พนักงานจัดซื้อ สอบถาม Supplier ว่าสามารถซื้อสินค้าได้จากที่ไหนบ้าง โดยเป็นสินค้าชนิดเดียวกัน และมีลักษณะวัตถุดิบ (Specification) เหมือนกัน ให้พนักงานจัดซื้อทำการจัดซื้อ และแผนกประกันคุณภาพทำการตรวจรับตามใบรายงานการตรวจรับวัตถุดิบ (FM-QA-007)

5.8.2 กรณีที่วัตถุดิบของผู้ขายไม่มีอยู่ในท้องตลาด

5.8.2.1 พนักงานจัดซื้อทำการสำรวจว่ามีวัตถุดิบที่มี Specification เหมือนหรือใกล้เคียงกับ Specification เดิมที่กำหนดหรือไม่

- ถ้ามีวัตถุดิบ พนักงานจัดซื้อทำการซื้อตามกระบวนการจัดซื้อ และหากเป็น Supplier เจ้าใหม่ (ไม่มีอยู่ใน AVL) ให้มีการประเมินคุณภาพเบื้องต้น และทำการบันทึกใน (FM-PU-003)
- ในกรณีที่ไม่มีสินค้า หรือเป็นวัตถุดิบที่ผลิตให้โดยเฉพาะ ไม่สามารถจัดซื้อทั่วไปได้ พนักงานจัดซื้อประสานงานสั่งซื้อเร่งด่วนกับ Supplier โดยกำหนดระยะเวลาที่ต้องการพร้อมจำนวน และประสานงานกับแผนกวางแผนเพื่อกำหนดแผนผลิตสินค้าใหม่ ทั้งนี้ต้องประสานงานกับหน่วยงานที่เกี่ยวข้องเพื่อรับทราบต่อไป

5.9 การควบคุมผู้ให้บริการ

5.9.1 ผู้ให้บริการที่เกี่ยวข้องกับด้านคุณภาพ และความปลอดภัยของอาหาร ทางแผนกที่ดูแลควบคุมต้องมีการจัดทำระเบียบปฏิบัติการคัดเลือกผู้ให้บริการและการควบคุมเพื่อประเมินประสิทธิภาพของงานบริการตามหัวข้อ 5.7.2 ว่าสามารถบริการตามความคาดหวัง และมั่นใจว่ามีการตกลงเกี่ยวกับความเสี่ยงความปลอดภัยของอาหารซึ่งครอบคลุมกิจกรรมผู้ให้บริการดังนี้

- การควบคุมสัตว์พาหะ	ผู้ดูแลควบคุม	แผนกประกันคุณภาพ	(PR-QA-019)
- การทดสอบห้องปฏิบัติการ และการสอบเทียบ	ผู้ดูแลควบคุม	แผนกประกันคุณภาพ	(PR-QA-019)
- งานซ่อมบำรุง	ผู้ดูแลควบคุม	แผนกซ่อมบำรุง	(PR-MT-002)
- การขนส่ง และกระจายสินค้า	ผู้ดูแลควบคุม	แผนกขายในประเทศ	(PR-SA-001)
		แผนกขายต่างประเทศ	(PR-SA-001)
- การจัดการขยะของเสีย	ผู้ดูแลควบคุม	แผนกทรัพยากรบุคคล	(PR-HR-007)

6. อ้างอิง

6.1 APPROVED VENDOR LIST (FM-PU-001)

6.2 VENDOR SELECTION RECORD (FM-PU-003)

6.3 ใบเสนอซื้อ (FM-PU-004)

6.4 ใบสั่งซื้อ (FM-PU-005)

6.5 ผลการประเมินผู้ขาย (SUPPLIER) (FM-PU-006)

6.6 ใบรายงานการตรวจรับวัตถุดิบ (FM-QA-007)

6.7 แผนผลิต MONTHLY PRODUCTION PLAN (FM-PD-025)

6.8 ขั้นตอนการจัดทำข้อกำหนดของวัตถุดิบ (WI-RD-004)

6.9 ใบประเมินผลงานซ่อมบำรุง (FM-MT-089)

6.10 ใบประเมินผลการขนส่งและกระจายสินค้า (FM-SA-008)

6.11 ใบประเมินผลการจัดการขยะของเสีย (FM-HR-041)

6.12 แบบฟอร์มการประเมินความเสี่ยงที่มีผลต่อด้านคุณภาพและความปลอดภัย ของวัตถุดิบ (FM-RD-016)

6.13 แบบฟอร์มสอบถามความเสี่ยงต่อการปนเปื้อนที่มีผลกระทบต่อด้านคุณภาพและความปลอดภัย (FM-RD-006)

6.14 แบบฟอร์มการคัดเลือกผู้ขาย (FM-PU-007)

7. เอกสารแนบ

7.1 APPROVED VENDOR LIST (FM-PU-001)

7.2 VENDOR SELECTION RECORD (FM-PU-003)

7.3 ใบเสนอซื้อ (FM-PU-004)

7.4 ใบสั่งซื้อ (FM-PU-005)

7.5 ผลการประเมินผู้ขาย (SUPPLIER) (FM-PU-006)

7.6 แบบฟอร์มการคัดเลือกผู้ขาย (FM-PU-007)

Author by:	Approve by:
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1. วัตถุประสงค์

เพื่อประเมินผู้ขาย วัตถุดิบ , บรรจุภัณฑ์ , วัสดุสิ้นเปลือง , งานซ่อมบำรุง , ห้องแลป , งานบริการ และงานทั่วไป ตามแบบฟอร์มผลการประเมินผู้ขาย (SUPPLIER) (FM-PU-006) ให้เป็นไปตามหลักเกณฑ์ข้อกำหนด

2. ขอบข่าย

จัดทำประเมินผู้ขาย วัตถุดิบ , บรรจุภัณฑ์ , วัสดุสิ้นเปลือง , งานซ่อมบำรุง , ห้องแลป , งานบริการ และงานทั่วไป ตามแบบฟอร์มผลการประเมินผู้ขาย (SUPPLIER) (FM-PU-006)

3. นิยาม

Supplier = ผู้ขาย , ผู้ส่งมอบ

4. หน้าที่ความรับผิดชอบ

4.1 พนักงานจัดซื้อ

4.2. ผู้จัดการจัดซื้อ

5. เนื้อหา

ต้นฉบับ

5.1 พนักงานจัดซื้อจัดทำการประเมินผู้ขายปีละ 1 ครั้ง

- ช่วงเวลาในการประเมิน คือ ระหว่างวันที่ 1 มกราคม – วันที่ 31 ธันวาคม

หลักเกณฑ์ในการพิจารณามี 9 หัวข้อ ดังนี้

- รถขนส่งมีความสะอาดและพร้อมในการใช้งาน	คะแนนเต็ม	5	คะแนน
- สินค้ามีการบรรจุหีบห่อตามมาตรฐานของแต่ละผลิตภัณฑ์	คะแนนเต็ม	5	คะแนน
- ให้ความร่วมมือเมื่อได้รับการร้องขอ	คะแนนเต็ม	10	คะแนน
- เอกสารในการส่งมอบไม่สูญหาย	คะแนนเต็ม	10	คะแนน
- เอกสารกับรายการสินค้าที่มาส่งไม่ผิดพลาด	คะแนนเต็ม	10	คะแนน
- ส่งมอบตรงเวลา	คะแนนเต็ม	20	คะแนน
- การให้ความร่วมมือในการแก้ไขปัญหาการส่งมอบ	คะแนนเต็ม	10	คะแนน
- ได้คุณภาพตามมาตรฐานที่กำหนด	คะแนนเต็ม	20	คะแนน
- การให้ความร่วมมือในการแก้ไขปัญหาด้านคุณภาพ	คะแนนเต็ม	10	คะแนน

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หมายเหตุ ถ้าเป็นการประเมินผู้ขายประเภทงานบริการ จะเปลี่ยนหลักเกณฑ์ในการพิจารณาดังนี้

- รถขนส่งมีความสะอาดและพร้อมในการใช้งาน เปลี่ยนเป็น ความเหมาะสมของราคา
  คะแนนเต็ม 5 คะแนน
- สินค้ามีการบรรจุหีบห่อตามมาตรฐานของแต่ละผลิตภัณฑ์ เปลี่ยนเป็น ราคาถูกต้องตามที่ตกลงกันไว้
  คะแนนเต็ม 5 คะแนน

เกณฑ์ระดับการประเมินผล

- ในการประเมินผู้ขาย มีทั้งหมด 4 หัวข้อใหญ่ มีคะแนนเต็ม 100 คะแนน โดยแยกเป็นการประเมินสภาพทั่วไป , การบริการ , การส่งมอบ และคุณภาพ

- การกำหนดการให้เกรด มีดังนี้

เกรด A = ดีมาก	ช่วง 90 - 100	คะแนน
เกรด B = ดี	ช่วง 80 - 89	คะแนน
เกรด C = พอใช้	ช่วง 70 - 79	คะแนน
เกรด D = ควรปรับปรุง	ต่ำกว่า 70	คะแนน

5.2 เมื่อได้ผลสรุปการประเมินผู้ขายแล้ว พนักงานจัดซื้อเซ็นชื่อผู้ประเมินพร้อมลงวันที่ ผู้จัดการจัดซื้อเซ็นต์ชื่อผู้อนุมัติพร้อมลงวันที่ แล้วจัดส่งทาง E-mail หรือทางโทรสารให้กับผู้ขายรับทราบ โดยให้ผู้ขายเซ็นชื่อในช่องผู้ขายพร้อมลงวันที่ และส่งยืนยันกลับในแบบฟอร์มผลการประเมินผู้ขาย (SUPPLIER) (FM-PU-006) ต่อไป

5.3 ถ้ามีผู้ขายรายใหม่ที่ได้เกรดต่ำ กว่าเกรด C จะต้องเขียนแนวทางการแก้ไข ตอบกลับมาด้วย

6. อ้างอิง

6.1 ฟอร์ม ผลการประเมินผู้ขาย (SUPPLIER) (FM-PU-006)

Author by:	Approve by:
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1. วัตถุประสงค์

เพื่อคัดเลือกผู้ขาย วัตถุดิบ ที่มีคุณภาพตามข้อกำหนด และเป็นไปตามความต้องการของบริษัท

2. ขอบข่าย

คัดเลือกผู้ขายวัตถุดิบ ตามฟอร์ม VENDOR SELECTION RECORD (FM-PU-003)

3. นิยาม

Supplier = ผู้ขาย , ผู้ส่งมอบ

4. หน้าที่ความรับผิดชอบ

4.1 พนักงานจัดซื้อ

4.2 ผู้จัดการจัดซื้อ

5. เนื้อหา

พนักงานจัดซื้อคัดเลือกผู้ขายวัตถุดิบ ที่มีคุณภาพตามข้อกำหนด และเป็นไปตามความต้องการของบริษัท โดยบันทึกข้อมูลของผู้ขายลงในแบบฟอร์ม VENDOR SELECTION RECORD (FM-PU-003) โดยแบ่งเป็น 2 ส่วน ดังนี้

5.1 <u>ส่วนที่ 1</u> พิจารณาจาก

- คุณภาพของวัตถุดิบ เช่น INGREDIENT , คุณภาพของสินค้า
- ความเหมาะสมของ PROCESS การผลิต เช่น PROCESS FLOW CHART , ความเหมาะสมของกระบวนการ
- ระบบคุณภาพ และการรับรองการผลิต จากระบบต่างๆ เช่น GMP, HACCP , BRC/IFS , ISO 9001 , ISO 14001 , HALAL , KOSHER เป็นต้น
- การควบคุมความเสี่ยงต่อการปนเปื้อน ที่มีผลกระทบทางด้านคุณภาพ และความปลอดภัย
- ความพร้อมในการขนส่ง
- กำลังการผลิตของ ผู้ขาย
- ราคาของสินค้า

5.1.1 หลักเกณฑ์การประเมินคัดเลือกผู้ขายคิดคะแนนเต็ม 100 % (โดยแบ่งเป็น 2 แผนกประเมิน) ดังนี้

1. ประเมินโดยแผนกวิจัยและพัฒนาผลิตภัณฑ์ (คิดคะแนนเต็มเป็นร้อยละ 70 %)

เมื่อจะทำการซื้อขายวัตถุดิบครั้งแรก ทางเจ้าหน้าที่แผนกจัดซื้อต้องจัดส่งแบบฟอร์มสอบถามความเสี่ยงต่อการปนเปื้อนที่มีผลกระทบต่อด้านคุณภาพและความปลอดภัย (FM-RD-006) ที่ได้รับจากแผนกวิจัยและพัฒนาผลิตภัณฑ์ เพื่อจัดส่งให้กับผู้ขายตอบแบบฟอร์มสอบถามดังกล่าวและส่งกลับคืน เมื่อเจ้าหน้าที่แผนกจัดซื้อได้รับเอกสารดังกล่าวคืนจากผู้ขายแล้ว จัดส่งต่อให้กับเจ้าหน้าที่แผนกวิจัยและพัฒนาผลิตภัณฑ์ เพื่อใช้เป็นข้อมูลในการประเมินผู้ขายในส่วนของแผนกวิจัยและพัฒนาผลิตภัณฑ์ โดยทำการประเมินและบันทึกคะแนนลงในแบบฟอร์มการประเมินความเสี่ยงที่มีผลต่อด้านคุณภาพและความปลอดภัยของวัตถุดิบ (FM-RD-016) และส่งให้ทางแผนกจัดซื้อใช้เป็นคะแนนในการประเมินคัดเลือกผู้ขาย

โดยแบบฟอร์มสอบถามความเสี่ยงต่อการปนเปื้อนที่มีผลกระทบต่อด้านคุณภาพและความปลอดภัย (FM-RD-006) จะต้องจัดส่งและประเมินผู้ขายทุกๆ 3 ปี หรือเมื่อมีการเปลี่ยนแปลงข้อมูล

2. ประเมินโดยแผนกจัดซื้อ (คิดคะแนนเต็มเป็นร้อยละ 30%)

เมื่อจะทำการซื้อขายวัตถุดิบครั้งแรก ทางเจ้าหน้าที่แผนกจัดซื้อต้องทำการประเมินผู้ขายในส่วนของแผนกจัดซื้อ โดยใช้แบบฟอร์มการคัดเลือกผู้ขาย FM-PU-007 และมีหลักเกณฑ์และเกณฑ์ในการประเมินผู้ขาย 3 หัวข้อดังนี้

1. มีความพร้อมในการขนส่ง คะแนนเต็ม 10 คะแนน
2. มีความพร้อมด้านกำลังการผลิตของผู้ขาย คะแนนเต็ม 10 คะแนน
3. มีราคาเหมาะสม คะแนนเต็ม 10 คะแนน

วิธีการคิดคะแนนให้เป็นเปอร์เซ็นต์

$$\frac{\text{คะแนนที่ประเมินได้} \times 30 \text{ (คะแนนเต็มร้อยละ 30\%)}}{30 \text{ (คะแนนเต็มจาก 3 หัวข้อ)}} = \text{เปอร์เซ็นต์ที่ประเมินได้}$$

หมายเหตุ - **คะแนนที่ประเมินได้** คือ คะแนนที่พนักงานจัดซื้อทำการประเมินผู้ขาย ใน 3 หัวข้อ

- **คะแนนเต็มร้อยละ 30%** คือ จากคะแนนเต็ม 100 % แบ่งเป็น แผนกจัดซื้อร้อยละ 30% และแผนกวิจัยและพัฒนาผลิตภัณฑ์ร้อยละ 70%
- **คะแนนเต็มจาก 3 หัวข้อ** คือ คะแนนของ 3 หัวข้อ หัวข้อละ 10 คะแนน (มีคะแนนเต็ม 30 คะแนน)

*** ถ้าคะแนนน้อยกว่า 60 % ถือว่าไม่ผ่านเกณฑ์การคัดเลือกผู้ขาย ***

	ประเภทเอกสาร	ขั้นตอนการปฏิบัติงาน	Document No.	WI-PU-001
			Revision No.	02
	ชื่อเอกสาร	VENDOR SELECTION RECORD	Effective Date	30/01/13
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5.1.2 เมื่อผ่านเกณฑ์การคัดเลือกผู้ขาย ในส่วนที่ 1 ผู้จัดการฝ่ายจัดซื้อ ผู้จัดการฝ่ายวิจัยและพัฒนาผลิตภัณฑ์ และผู้จัดการฝ่ายประกันคุณภาพเซ็นต์ชื่ออนุมัติลงในแบบฟอร์ม (FM-PU-003) ส่วนที่ 1

5.2 ส่วนที่ 2 พิจารณาจาก

- ใบรายงานผลการวิเคราะห์ (COA) ของวัตถุดิบที่รับเข้า

เมื่อมีการจัดซื้อครบ 5 ครั้ง (โดยมีเอกสารรายงานตรวจรับวัตถุดิบ,ใบรับรองผลวิเคราะห์ (CERTIFICATE OF ANALYSIS) แล้ว ทางแผนกประกันคุณภาพจะทำการทวนสอบผลวิเคราะห์ (COA) โดยจัดส่งตัวอย่างสินค้า ไปตรวจวิเคราะห์กับห้องปฏิบัติการภายนอก อย่างน้อย 3 ครั้ง

5.2.1 เมื่อผลตรวจสอบจากห้องปฏิบัติการวิเคราะห์จากภายนอกผ่านเกณฑ์ตามข้อกำหนด ผู้จัดการฝ่ายจัดซื้อ ผู้จัดการฝ่ายประกันคุณภาพ และกรรมการผู้จัดการ หรือผู้มีอำนาจแทน เซ็นต์ชื่ออนุมัติลงในแบบฟอร์ม (FM-PU-003) ส่วนที่ 2

6. อ้างอิง

6.1 VENDOR SELECTION RECORD (FM-PU-003)

6.2 แบบฟอร์มสอบถามความเสี่ยงต่อการปนเปื้อนที่มีผลกระทบต่อด้าน คุณภาพและความปลอดภัย (FM-RD-006)

6.3 แบบฟอร์มการประเมินความเสี่ยงที่มีผลต่อด้านคุณภาพและความปลอดภัยของวัตถุดิบ (FM-RD-016)

6.4 แบบฟอร์มการคัดเลือกผู้ขาย (FM-PU-007)

Author by:	Approve by:

	ประเภทเอกสาร	ขั้นตอนการปฏิบัติงาน	Document No.	WI-PU-002
Pizza Bar			Revision No.	00
	ชื่อเอกสาร	APPROVED VENDOR LIST	Effective Date	18/06/10
			Page of Page	Page 1 of 1

1. วัตถุประสงค์

เพื่อจัดเก็บข้อมูลผู้ขาย วัตถุดิบ , บรรจุภัณฑ์ , วัสดุสิ้นเปลือง , งานซ่อมบำรุง , ห้องแลป , งานบริการ และงานทั่วไป ที่มีคุณภาพตามข้อกำหนด และเป็นไปตามความต้องการของบริษัท

2. ขอบข่าย

จัดเก็บข้อมูลผู้ขาย วัตถุดิบ , บรรจุภัณฑ์ , วัสดุสิ้นเปลือง , งานซ่อมบำรุง , ห้องแลป , งานบริการ และงานทั่วไป ตามแบบฟอร์ม APPROVED VENDOR LIST (FM-PU-001)

3. นิยาม

Supplier = ผู้ขาย , ผู้ส่งมอบ

4. หน้าที่ความรับผิดชอบ

4.1 พนักงานจัดซื้อ

5. เนื้อหา

5.1 หลังจากมีการมีการเลือกผู้ขายวัตถุดิบ , บรรจุภัณฑ์ , วัสดุสิ้นเปลือง , งานซ่อมบำรุง , ห้องแลป ,งานบริการ และงานทั่วไป ที่มีคุณภาพตามข้อกำหนด และเป็นไปตามความต้องการของบริษัท VENDOR SELECTION RECORD (FM-PU-003) แล้วนั้น พนักงานจัดซื้อดำเนินการจัดทำ APPROVED VENDOR LIST (FM-PU-001) ตามหมวดหมู่ที่กำหนด

6. อ้างอิง

6.1 APPROVED VENDOR LIST (FM-PU-001)

6.2 VENDOR SELECTION RECORD (FM-PU-003)

Author by:	Approve by:

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ต้นฉบับ

Appendix F : Questionnaires forms (Google's spreadsheet)

Edit this form

Collaboration, Information Sharing, and Job Satisfaction

5-point scale indicating 'agree' or 'disagree' : ① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

NAME

☐ male
☐ female

Age

Educational background

☐ high school
☐ technical school
☐ bachelor degree
☐ master degree

Personal information

What is your position in the company

Work satisfaction

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Salary and incentive are adequate	○	○	○	○	○

Company's policy is understandable and make sense	○	○	○	○	○
There is good relationship in the office	○	○	○	○	○
I am satisfied with my work	○	○	○	○	○
I study/work harder to improve my skill	○	○	○	○	○
I enjoy working	○	○	○	○	○
I do my best to finished the task	○	○	○	○	○

Work commitment

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
I want to improve my skill	○	○	○	○	○
I'm the key player for my company	○	○	○	○	○
I want to be a leader or be promoted soon	○	○	○	○	○

Information Sharing

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier exchange information ?	○	○	○	○	○
Do our firm and supplier exchange timely information ?	○	○	○	○	○
Do our firm and supplier exchange accurate information ?	○	○	○	○	○
Do our firm and					

supplier exchange confidential information ?	○	○	○	○	○

Goal congruence :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier have agreement upon the supply chain goal ?	○	○	○	○	○
Do our firm and supplier have agreement upon the importance of the supply chain collaboration ?	○	○	○	○	○
Do our firm and supplier have an agreement upon the supply chain's transparency ?	○	○	○	○	○
Do our firm and supplier have the agreement upon the importance of improving the supply chain's transparency ?	○	○	○	○	○
Do our firm and supplier have jointly collaboration plan to improve the supply chain goal ?	○	○	○	○	○

Decision Synchronization :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier jointly develop the demand forecast ?	○	○	○	○	○

Do our firm and supplier jointly manage the inventory ?	○	○	○	○	○
Do our firm and supplier jointly plan on product assortment ?	○	○	○	○	○
Do our firm and supplier jointly work out solutions towards problem found ?	○	○	○	○	○

Incentive Alignment :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier co-develop system to evaluate each other's performance (e.g. KPI, scorecard) ?	○	○	○	○	○
Do our firm and supplier share cost (loss and order change), benefits (saving on reduced inventory costs), risks ?	○	○	○	○	○

Collaborative Communication :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier have frequent contacts on regular basis ?	○	○	○	○	○
Do our firm and supplier have open and two-way communication ?	○	○	○	○	○
Do our firm and supplier have					

many different channels to communicate ?					
Do our firm and supplier influence each other's decisions through discussion rather than request ?					

Process efficiency :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier meet productivity standards in comparison with industry norms ?					

Offering flexibility :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier offer a variety of products and service efficiency in comparison with industry norms ?					
Do our firm and supplier offer services with different features quickly in comparison with industry norms ?					
do our firm and supplier have good customer responsiveness in comparison with industry norms ?					

Quality :

① = Strongly disagree, ② = disagree, ③ = Neutral, ④ = Agree, ⑤ = Strongly agree

	①	②	③	④	⑤
Do our firm and supplier offer products that are highly reliable ?	○	○	○	○	○
Do our firm and supplier offer high quality products to our customers ?	○	○	○	○	○
Do our firm and supplier have help each other to improve the product quality ?	○	○	○	○	○

Assess your firm's information system capability in following dimensions :

① = not capable, ⑤ = Highly capable

	①	②	③	④	⑤
Information accuracy	○	○	○	○	○
Information availability	○	○	○	○	○
Real-time information	○	○	○	○	○
Internal connectivity	○	○	○	○	○
External connectivity	○	○	○	○	○
Updating information frequently	○	○	○	○	○
Information completeness	○	○	○	○	○
Information relevence	○	○	○	○	○
Information accessibiltiy	○	○	○	○	○

How often does your firm "electronically" provide your major customer with your firm's information in the following dimensions :

① = never, ③ = quarterly, ⑤ weekly

	①	②	③	④	⑤
Changes in purchase order information	○	○	○	○	○
Planned order information	○	○	○	○	○
Inventory level information	○	○	○	○	○
Product design specification	○	○	○	○	○
Future demand forecasting information	○	○	○	○	○
Production planning information	○	○	○	○	○

How often does your major customer "electronically" provide your firm with it's information in the following dimensions:

① = never, ③ = quarterly, ⑤ = weekly

	①	②	③	④	⑤
Production capacity information	○	○	○	○	○
Order status information	○	○	○	○	○
Delivery schedule information	○	○	○	○	○
Changes in delivery schedule	○	○	○	○	○
Lead-time information for products	○	○	○	○	○

What percentage of the information in the following dimensions does your firm provide to your major customer in

an "electronical" format

① = 0-20%, ③ 40-60%, ⑤ = 80-100%

	①	②	③	④	⑤
Changes in purchase order information	○	○	○	○	○
Planned order information	○	○	○	○	○
Inventory level information	○	○	○	○	○
Product design specifications	○	○	○	○	○
Future demand forecasting information	○	○	○	○	○
Production planning information	○	○	○	○	○

What percentage of the information in the following dimensions does your major customer provide your firm in an "eletronical" format

① = 0-20%, ③ 40-60%, ⑤ = 80-100%

	①	②	③	④	⑤
Production capacity information	○	○	○	○	○
Order status information	○	○	○	○	○
Delivery schedule information	○	○	○	○	○
Changes in delivery schedule	○	○	○	○	○
Lead time information for products	○	○	○	○	○

Submit

Never submit passwords through Google Forms.

Appendix G : Steps of T-Test calculations

Steps of performing T-Test

- Count the quantity of argument numbers contain in one cell (=COUNT, =SUM)
- Find the arithmetic mean of a collection of numbers (=AVERAGE)
- Calculate the square deviation which is the sum of all the square deviations of a collection numbers from average (=DEVSQ)
- Calculate the degree of freedom by sum of the data and minus by 2
- Perform the pooled dispersion : sum of square deviation divided by degree of freedom (must be greater than or equal to 1)
- Calculate the differences of the average and pooled dispersion through statistical quantity t value (=TTEST)
- Find P-value through function (=TDIST) which is the probability of the t-distribution, if the calculated P-value is greater than 1% between one-sided and two-sided then the assumption of average is accepted as they are different.

Appendix H : Questionnaires results (EXCEL)

Work satisfaction		ABC company (16)	supplier (6)	Average		S.D.		T-Test
				ABC	Sup.	ABC	sup.	
salary	very dissatisfie	0.00%	0.00%					
	dissatisfied (2)	-25.00%	-16.67%					
	neutral (3)	37.50%	50.00%	3.188	3.333	0.911	1.033	0.768526
	satisfied (4)	31.25%	16.67%					
	very satisfied (5	6.25%	16.67%					
company policy	very dissatisfie	0.00%	0.00%					
	dissatisfied (2)	-12.50%	-16.67%					
	neutral (3)	31.25%	33.33%	3.438	3.5	0.964	1.049	0.90177441
	satisfied (4)	43.75%	33.33%					
	very satisfied (5	12.50%	16.67%					
work environment	very dissatisfie	0.00%	0.00%					
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	12.50%	50.00%	4.375	3.667	0.719	0.816	0.09787227
	satisfied (4)	37.50%	33.33%					
	very satisfied (5	50.00%	16.67%					
work satisfaction	very dissatisfie	0.00%	0.00%					
	dissatisfied (2)	-18.75%	0.00%					
	neutral (3)	31.25%	66.67%	3.438	3.5	0.964	0.837	0.88401787
	satisfied (4)	37.50%	16.67%					
	very satisfied (5	12.50%	16.67%					
skill improvement	very dissatisfie	0.00%	0.00%					
	dissatisfied (2)	-12.50%	-33.33%					
	neutral (3)	31.25%	50.00%	3.625	3	0.957	1.095	0.25264436
	satisfied (4)	37.50%	0.00%					
	very satisfied (5	18.75%	16.67%					
work enjoyment	very dissatisfie	-6.25%	0.00%					
	dissatisfied (2)	-18.75%	-33.33%					
	neutral (3)	37.50%	50.00%	3.25	3	1.183	1.095	0.65131621
	satisfied (4)	18.75%	0.00%					
	very satisfied (5	18.75%	16.67%					
work commitment								
perception	very dissatisfie	0.00%	0.00%					

Work satisfaction		ABC company (16)	supplier (6)	Average		S.D.		T-Test
				ABC	Sup.	ABC	sup.	
towards self performance	dissatisfied (2)	-12.50%	-16.67%	3.625	3.333	0.957	1.033	0.56324745
	neutral (3)	31.25%	50.00%					
	satisfied (4)	37.50%	16.67%					
	very satisfied (5	18.75%	16.67%					
self-improvement	very dissatisfie	0.00%	0.00%	3.688	3.333	1.014	0.816	0.41547199
	dissatisfied (2)	-18.75%	-16.67%					
	neutral (3)	12.50%	33.33%					
	satisfied (4)	50.00%	50.00%					
	very satisfied (5	18.75%	0.00%					
Recognition	very dissatisfie	0.00%	0.00%	4	3.167	0.816	0.753	0.0481077
	dissatisfied (2)	-6.25%	-16.67%					
	neutral (3)	12.50%	50.00%					
	satisfied (4)	56.25%	33.33%					
	very satisfied (5	25.00%	0.00%					
work promotion	very dissatisfie	0.00%	0.00%	4.438	3.5	0.814	0.548	0.00805044
	dissatisfied (2)	-6.25%	0.00%					
	neutral (3)	0.00%	50.00%					
	satisfied (4)	37.50%	50.00%					
	very satisfied (5	56.25%	0.00%					

		ABC company (16)	Supplier (6)	AVERAGE		S.D.		T-Test
				ABC	sup.	ABC	sup.	
Exchange information	very dissatisfied (1)	0.00%	0.00%	3.9	3.3	0.4	0.52	0.0534
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	12.50%	66.67%					
	satisfied (4)	87.50%	33.33%					
	very satisfied (5)	0.00%	0.00%					
often exchange the information	very dissatisfied (1)	0.00%	0.00%	3.9	3.5	0.4	0.55	0.1743
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	12.50%	50.00%					
	satisfied (4)	87.50%	50.00%					
	very satisfied (5)	0.00%	0.00%					

		ABC company (16)	Supplier (6)	AVERAGE		S.D.		T-Test
				ABC	sup.	ABC	sup.	
accuracy of information	very dissatisfied (1)	0.00%	0.00%	3.4	3.3	0.7	0.52	0.818
	dissatisfied (2)	-6.25%	0.00%					
	neutral (3)	50.00%	66.67%					
	satisfied (4)	37.50%	33.33%					
	very satisfied (5)	6.25%	0.00%					
exchange confidential data	very dissatisfied (1)	-43.75%	0.00%	2	3.2	1.1	0.98	0.0393
	dissatisfied (2)	-25.00%	-33.33%					
	neutral (3)	18.75%	16.67%					
	satisfied (4)	12.50%	50.00%					
	very satisfied (5)	0.00%	0.00%					

		ABC company	Supplier	Average		S.D.		T-Test
				ABC	sup.	ABC	Sup.	
goal agreement	very dissatisfied (1)	0.00%	0.00%	3.6	3.17	0.63	0.41	0.0837884
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	43.75%	83.33%					
	satisfied (4)	43.75%	16.67%					
	very satisfied (5)	12.50%	0.00%					
know the importance of supply chain collaboration	very dissatisfied (1)	0.00%	0.00%	3.6	3.17	0.63	0.41	0.0837884
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	43.75%	83.33%					
	satisfied (4)	43.75%	16.67%					
	very satisfied (5)	12.50%	0.00%					
show transparency in supply chain	very dissatisfied (1)	0.00%	0.00%	3.6	3.83	0.74	0.41	0.3695246
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	50.00%	16.67%					
	satisfied (4)	37.50%	83.33%					
	very satisfied (5)	12.50%	0.00%					
know the importance of improving supply chain	very dissatisfied (1)	0.00%	0.00%	3.6	3.83	0.6	0.41	0.33376
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	50.00%	16.67%					

		ABC company	Supplier	Average		S.D.		T-Test
				ABC	sup.	ABC	Sup.	
supply chain transparency	satisfied (4)	43.75%	83.33%					
	very satisfied (5)	6.25%	0.00%					
jointly collaborate to improve the supply chain	very dissatisfied (1)	0.00%	0.00%	3.4	3.5	0.83	0.55	0.7512617
	dissatisfied (2)	-12.50%	0.00%					
	neutral (3)	37.50%	50.00%					
	satisfied (4)	43.75%	50.00%					
	very satisfied (5)	6.25%	0.00%					

		ABC company	Supplier	Average		S.D.		T-Test
				ABC	sup.	ABC	Sup.	
Jointly develop demand forecast	very dissatisfied (1)	-6.25%	-16.67%	2.53333	1.83333	0.91548	0.40825	0.02597
	dissatisfied (2)	-56.25%	-83.33%					
	neutral (3)	18.75%	0.00%					
	satisfied (4)	18.75%	0.00%					
	very satisfied (5)	0.00%	0.00%					
jointly manage the inventory	very dissatisfied (1)	-12.50%	-16.67%	2.4	1.83333	0.91026	0.40825	0.06439
	dissatisfied (2)	-43.75%	-83.33%					
	neutral (3)	31.25%	0.00%					
	satisfied (4)	12.50%	0.00%					
	very satisfied (5)	0.00%	0.00%					
jointly plan the product assortment	very dissatisfied (1)	-12.50%	-33.33%	2.33333	1.83333	0.89974	0.75277	0.22075
	dissatisfied (2)	-56.25%	-18.75%					
	neutral (3)	18.75%	16.67%					
	satisfied (4)	12.50%	0.00%					
	very satisfied (5)	0.00%	0.00%					
jointly solve the problem found	very dissatisfied (1)	-18.75%	33.33%	2.4	1.83333	1.12122	0.75277	0.20105
	dissatisfied (2)	-43.75%	-50.00%					
	neutral (3)	25.00%	16.67%					
	satisfied (4)	6.25%	0.00%					
	very satisfied (5)	6.25%	0.00%					

		ABC company	Supplier	Average		S.D.		T-Test
				ABC	sup.	ABC	Sup.	
Co-develop system to evaluate each other's performance (KPI)	very dissatisfie	-75.00%	-100.00%	1.33333	1	0.61721	0	0.05518
	dissatisfied (2)	-18.75%	0.00%					
	neutral (3)	6.25%	0.00%					
	satisfied (4)	0.00%	0.00%					
	very satisfied (5	0.00%	0.00%					
Share loss, benefits, and risks	very dissatisfie	-31.25%	-100.00%	2	1	0.75593	0	0.00015
	dissatisfied (2)	-43.75%	0.00%					
	neutral (3)	25.00%	0.00%					
	satisfied (4)	0.00%	0.00%					
	very satisfied (5	0.00%	0.00%					

Process efficiency		ABC company	Supplier	AVERAGE		S.D.		T-Test
				ABC	SUP.	ABC	SUP.	
productivity meet the standard of the industrial norm	very dissatisfied (1)	0.00%	0.00%	3.75	3.33	0.86	0.52	0.185481
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	50.00%	66.67%					
	satisfied (4)	25.00%	33.33%					
	very satisfied (5)	25.00%	0.00%					
offering flexibility								
offer variety of product	very dissatisfied (1)	0.00%	0.00%	2.81	2.5	0.83	0.84	0.4549159
	dissatisfied (2)	-43.75%	-66.67%					
	neutral (3)	31.25%	16.67%					
	satisfied (4)	25.00%	16.67%					
	very satisfied (5)	0.00%	0.00%					
offer different service and feature	very dissatisfied (1)	0.00%	0.00%	2.69	2.5	0.87	0.84	0.6542166
	dissatisfied (2)	-50.00%	-66.67%					
	neutral (3)	37.50%	16.67%					
	satisfied (4)	6.25%	16.67%					
	very satisfied (5)	6.25%	0.00%					
good customer	very dissatisfied (1)	0.00%	0.00%					
	dissatisfied (2)	-18.75%	-66.67%					

Process efficiency		ABC company	Supplier	AVERAGE		S.D.		T-Test
				ABC	SUP.	ABC	SUP.	
responsiveness	neutral (3)	56.25%	16.67%	3.06	2.5	0.68	0.84	0.1804348
	satisfied (4)	25.00%	16.67%					
	very satisfied (5)	0.00%	0.00%					
QUALITY								
products are highly reliable	very dissatisfied (1)	0.00%	0.00%	4.25	3.67	0.45	0.82	0.1468497
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	0.00%	50.00%					
	satisfied (4)	75.00%	33.33%					
	very satisfied (5)	25.00%	16.67%					
provide high quality product to end customer	very dissatisfied (1)	0.00%	0.00%	4.38	3.83	0.5	0.98	0.2450528
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	0.00%	50.00%					
	satisfied (4)	62.50%	33.33%					
	very satisfied (5)	37.50%	16.67%					
Help each other to improve product quality	very dissatisfied (1)	0.00%	0.00%	4.31	3.83	0.48	0.98	0.2968095
	dissatisfied (2)	0.00%	0.00%					
	neutral (3)	0.00%						
	satisfied (4)	68.75%	50.00%					
	very satisfied (5)	31.25%	33.33%					

		ABC company	Supplier	AVERAGE		S.D.		T-Test
				ABC	SUP.	ABC	SUP.	
Info accuracy	very dissatisfied (1)	0.00%	0.00%	3.375	3.16667	0.5	0.75277	0.55074
	dissatisfied (2)	0.00%	16.67%					
	neutral (3)	62.50%	50.00%					
	satisfied (4)	37.50%	33.33%					
	very satisfied (5)	0.00%	0.00%					
info availability	very dissatisfied (1)	0.00%	0.00%	3.75	-2.83333	0.44721	0.75277	0.02911
	dissatisfied (2)	0.00%	33.33%					
	neutral (3)	25.00%	50.00%					
	satisfied (4)	75.00%	16.67%					

	very satisfied (5)	0.00%	0.00%					
real-time info	very dissatisfied (1)	0.00%	66.67%	-2.6875	-1.33333	0.7932	0.5164	0.00035
	dissatisfied (2)	50.00%	33.33%					
	neutral (3)	31.25%	0.00%					
	satisfied (4)	18.75%	0.00%					
	very satisfied (5)	0.00%	0.00%					
internal connectivity	very dissatisfied (1)	0.00%	0.00%	3.375	-2.83333	0.7188	0.75277	0.16374
	dissatisfied (2)	6.25%	33.33%					
	neutral (3)	56.25%	50.00%					
	satisfied (4)	31.25%	16.67%					
	very satisfied (5)	6.25%	0.00%					
external connectivity	very dissatisfied (1)	0.00%	0.00%	3.1875	3	0.65511	0.89443	0.65342
	dissatisfied (2)	12.50%	33.33%					
	neutral (3)	56.25%	33.33%					
	satisfied (4)	31.25%	33.33%					
	very satisfied (5)	0.00%	0.00%					
update info frequently	very dissatisfied (1)	0.00%	0.00%	-2.75	-2	0.57735	0.89443	0.10006
	dissatisfied (2)	31.25%	33.33%					
	neutral (3)	62.50%	33.33%					
	satisfied (4)	6.25%	33.33%					
	very satisfied (5)	0.00%	0.00%					
info completeness	very dissatisfied (1)	0.00%	16.67%	3.5625	-2.66667	0.89209	1.0328	0.09728
	dissatisfied (2)	12.50%	16.67%					
	neutral (3)	31.25%	50.00%					
	satisfied (4)	43.75%	16.67%					
	very satisfied (5)	12.50%	0.00%					
	very dissatisfied (1)	0.00%	0.00%					

info relevance	dissatisfied (2)	0.00%	33.33%	4	-2.83333	0.63246	0.75277	0.01004
	neutral (3)	18.75%	50.00%					
	satisfied (4)	62.50%	16.67%					
	very satisfied (5)	18.75%	0.00%					
info accessibility	very dissatisfied (1)	0.00%	0.00%	3.1875	-2.83333	0.65511	0.75277	0.33881
	dissatisfied (2)	12.50%	33.33%					
	neutral (3)	56.25%	50.00%					
	satisfied (4)	31.25%	16.67%					
	very satisfied (5)	0.00%	0.00%					

Biography

Miss Natta Asvathavornvanit has educational background in Material science (metallurgy) from Faculty of Science, Chulalongkorn University (bachelor degree) and Inorganic Chemistry background from Florida State University, Tallahassee FL, United states of America (exchanged researcher program).

She has seen the opportunity in Industrial Engineering science underpinning it’s importance exactly right into the center of her family’s business (frozen-food industry) for the past decades. That has led her to extend the academic program by attending the Engineering Business Management for her master degree at Regional Centre for Manufacturing Systems Engineering, a co-program between Chulalongkorn University (Thailand) and University of Warwick (United Kingdom).