

SUSTAINABLE COMPETITIVE ADVANTAGE IN FURNITURE INDUSTRY: COMPARATIVE STUDIES IN FINLAND, CHINA AND MALAYSIA

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Abstract: Global challenges in the sustainable competitive operations and technology strategies become more intense, when the world economy is in crisis and due to growing trend of 'China Effect'. The studies on Global Manufacturing Strategies created separate results to be integrated into resource allocations. Miles & Snow (1978) and Takala (2007) competitive categories (prospector, defender and analyzer) might be integrated into Sense and Respond (S&R) resource and technology allocations by the S&R attributes according to their influence to Cost, Time, Quality or Flexibility. The importance of different technology levels (Basic, Core or Spearhead) affects strategy implementation by the knowledge required creating the chance to build dynamically the future change of operational strategy according to the technology/knowledge (T/K) ranking, based on their effect to performance, including opportunities and risks. By acquiring samples from furniture industry, in 3 countries namely Finland, China and Malaysia, it is possible to find out the correlation between the technology and operational strategies preferred.

Keywords: Sustainable Competitive Advantage, Critical Factor Index (CFI), Operational Strategy, Furniture Industry, Malaysia, Finland, China

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1.0 INTRODUCTION

The world economy has been truly globalized due to technological advances, scarcity and abundance of resources in many parts of the world, plus moving knowledge and expertise in current knowledge-based economy. These trends pose a more competitive world in doing business for many firms in many countries. Companies are engaging sustainable competitive approach and technology strategy to efficiently manage their resources. China, has been dubbed as “the world super-contractor” particularly in manufacturing, poses global effects on worldwide business operation. High per capita income country, such as Finland, and newly developing tiger, as Malaysia, have been pitching their business operations with lots of pressures from shadow of China’s effects. In this 3-nation study, furniture industry is identified as an appropriate platform for a Global Manufacturing Strategy research. Furniture production is highly correlated with construction industry of a nation, given the fact that buildings, office or homes, require furniture as parts and parcels of their finishing.

The study demonstrates evaluation and application of “Sense and Response (S&R)” resource assessment tool for gaining more accurate results and knowledge for taking right strategic steps as well as distributing priorities correctly between the attributes affecting company’s performance. The main target is to synthesize the results of Critical Factor Index (CFI) and Balanced CFI abbreviation as well (BCFI), after the first (linear) calculation, for aligning company strategy towards appropriate direction. Sustainable Competitive Advantage (SCA) formulation framework is applied to harness firms moving into appropriate directions, based on operation strategy (cost, quality, time), S&R analysis and RAL (Responsiveness-Leanness-Agility) model of future strategy.

Additional technological competence valuations prepared to clarify whether the critical attributes remain constant. Based on the occurring changes, company’s management can change process priorities and reallocate resources, reacting in a timely manner with relevant approach. Through the progression of the attribute importance from critical to non-critical we can define the company’s approach to such resources like knowledge and technology, as well as their role in the general performance.

1.1 Research Questions

Based on this research setting, a set of research questions to be pursued is stated, as follows;

RQ1.

What are the SCA and S&R resource allocation profiles among furniture firms in Finland, China and Malaysia?

RQ2.

How can competitive advantage be evaluated by Sense & Respond methodology?

RQ3.

How SCA potentials could be applied, to harness furniture firms moving towards right direction based on available resources, especially in Malaysia business perspective?

1.2 Focus Group

The investigation was based on analysis of Leading Technology and Training organization for wood and furniture industries in Finland, Association of Furniture Manufacturers in China and leading manufacturer of home/office furniture in Malaysia. In addition, the chosen research method was survey; the interviewee focus group consisted of the company's board members, hence insuring high level of expertise for the obtained answers. Nevertheless, the main limiting scope of the research is the small sample – few targeted number of participants (board members, managers, executives).

1.3 Research Significance

To the best of researchers' knowledge, this is the first attempt on studying global manufacturing strategy, in furniture industry, which involves 3 countries namely Finland (Europe) and China plus Malaysia (Asia). As such, it is expected that the scientific and empirical findings of such study are able to assist the involving firms' managers to adapt and chart more effective path towards attaining their company vision. Hence, these add to the body of knowledge pertaining to sustainable competitive advantage and operation strategy between Europe and Asia for global business advantages.

2.0 LITERATURE REVIEW

Generally, companies doing business are with clear vision to achieve within particular time frame. In pursuance of the vision, there are many uncertainties (known and unknown), called 'strategy fog'. Within this foggy strategic cloud, firms have to work-out means for crafting the best future strategy, to realize the vision. To realize the whole cycle from strategy to attaining the actual vision, manufacturing firms in particular, have to have clear strategy in mind, transforming it into actual operation strategy which is focusing on cost, quality and delivery. Subsequently, Sense and Response (S&R) can be applied to gauge current situations and necessary knowledge, in order to execute right strategic steps as well as distributing priorities. A key stage for future sustainability is determining the best future strategy, whether they are of type Analyzer (A), Defender (D) or Prospector (P). Having executed all the stages, then the vision can be attained on achievable and appropriate manner.

Operation performance can be described based on three (3) parameters, namely cost, time and quality. Cost (C) is specifically described and partially associated with;

- a) Innovativeness and performance of R&D,
- b) Knowledge and technology diffusion,
- c) Reduction of unprofitable time in process,
- d) Leadership and management systems of the company,
- e) Code of conduct and security of data/information,
- f) Training and development of the company's personnel,
- g) Short and prompt lead-times in order-fulfillment process,

- h) Adaptiveness of changes in demands and in order backlog,
- i) Well-defined responsibilities and tasks for each operation, and
- j) Utilizing different types of organizing systems.

In addition, operation performance in measuring time (T) can be gauges by;

- k) Communication between departments and hierarchy levels,
- l) Design and planning on the processes and products,
- m) Information systems support the business processes,
- n) Visibility of information in IT systems, and
- o) Availability of information in IT systems.

The last components of firms' operational performance, quality (Q) can be derived from elements, namely;

- p) On-time deliveries to customer,
- q) Control and optimization of all types of inventories
- r) Quality control of products, processes and operations
- s) Quality and reliability of information in IT systems, and
- t) Usability and functionality of IT systems.

RAL model is derived from 3 key dimensions of Responsiveness (R), Agility (A) and Leanness (L), which bounds Cost (C), Quality (Q) and Time (T) into a triangle. Sustainable competitiveness can be classified into three (3) different groups, namely;

- i) Prospector: firms tend to be keen in seeking new and better ways in doing things, such as new product development, venturing into new market, creating new processes, new ways of organizing things and new sources of supply (Johanessen et al., 2001)
- ii) Analyzer: firms are seeking to balance between cost, quality and time. Hence, they are always busy at getting and sensing current data, information and knowledge. Such an analyzer firm is positioned between prospector and, the last group namely defender.
- iii) Defender: companies are always defending their status quo as the cost leader. They are always championing the lowest cost agenda internally and more importantly externally. In general, lowering cost is passed to the supplying firms.

RAL model signifies responsiveness (R) towards timeliness and speed at complying and satisfying unanticipated requirements, such as ad-hoc orders and changes of orders' specifications. Agility (A) refers to speed by which the system adapts to the optimal cost structure, such as major customers demand for price/unit reduction and price increase for raw materials. Leanness (L) implies to minimizing waste in all resources and business activities, such as reducing set-up time and streamlining assembly stations.

2.1 Expectation and Experience

The average levels of expectations are higher than the actual level of experiences, which means that the stated targets were not fully achieved (gap between ideal and reality). As such, the sustainable competitive advantage can be built by Sand Cone layers by the performance gaps 'in the right order' (Takala *et al*, Management Decision 2005).

In this study, the firms' attributes are measured against expectation and experience, respectively by a scale of 1 until 10. By incorporating the equivalent attributes, these parameter are also gauged against two (2) other parameter, namely (a) Compared with competitor and (b) Direction of development, with 3-staged scale: Worse, Same, Better. Having specifying that, now it is possible for visual representation for depicting the histograms of expectation against experience (Ranta and Takala, 2007).

2.2 Sense and Respond (S&R) framework

Sense and respond (S&R) is a business concept first introduced by Haeckel in 1992 and later being developed by Bradley and Nolan (1998) and Markides (2000) to analyze dynamic business strategies. Until now the revolution of S&R model development has gone through three stages of development, which are called CFI model, BCFI model, and SCFI model (Liu & Takala, 2012). Sense & Respond method measures criticality of company's vital attributes in terms of resourcing and performance. Results of the survey are indicated by "Traffic light bars". Red indicates that the attribute is critical and needs a closer review. Green indicates that the attribute is in order. Yellow means that responses are scattered and the respondents have different understanding. Figure 1 shows the Balanced Critical Factors (BCFI) mechanism, by incorporating the S&R framework.

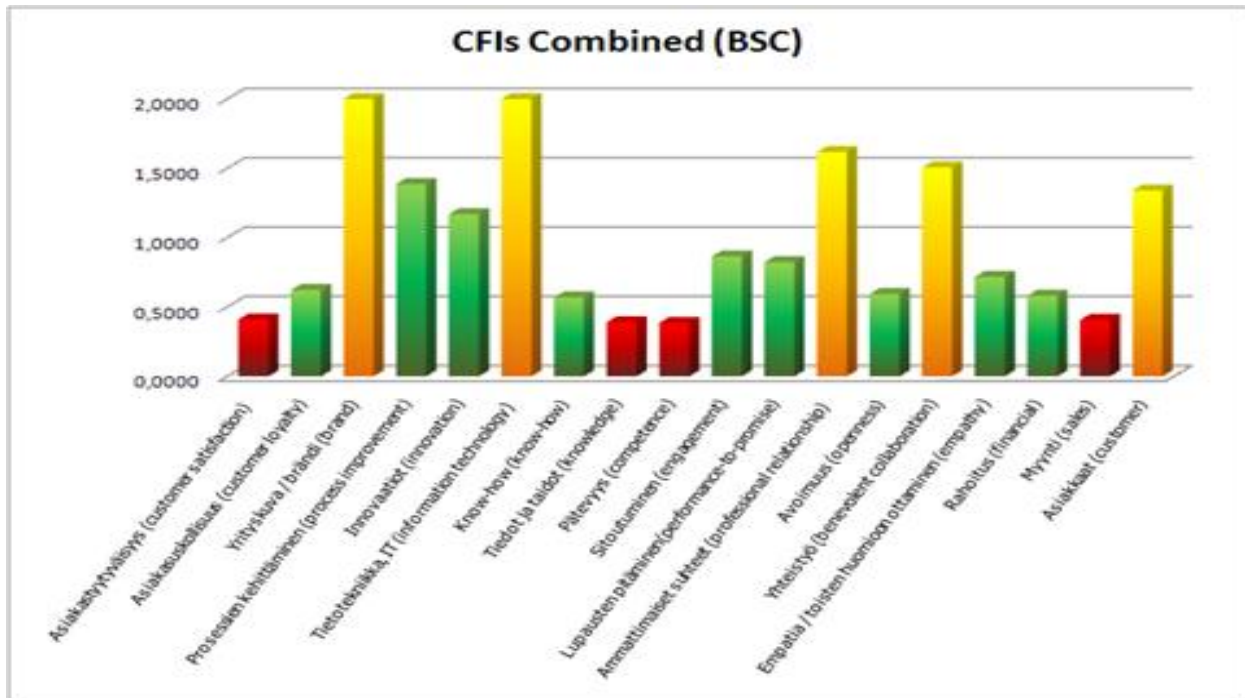


Figure 1: BCFI with schematic color system of S&R

It is noticeable that attributes are plotted in histogram base with specific colors, as red (requires action), green (doing good) and yellow (get ready to take initiative). Among attributes that are shown this figure, namely customer satisfaction that has weighted scale value of 0.4 and having red color. This signifies the fact that the firm management has to initiate urgently, a specific measure to address satisfaction among their customers. Attribute of brand has been noted with yellow color with concerning value of 1.9. This implies that the firm must get ready to take action to improve conditions on product branding. Since the value is highest, it is deemed as that such action must be done as soonest as possible. Lastly on the S&R framework, attribute of process improvement has weighted value of 1.35 and being in green color. This means that the firm has been doing excellently in enhancing internal production process improvement, as line balancing, minimizing waste and reducing lead time to delivery.

S&R framework is an analytical model that based on mathematical formula (Ranta and Takala, 2007), derived from Critical Factor Index (CFI) which is shown in formula below.

$$CFI = \frac{SD \text{ of expectation} * SD \text{ of experience}}{\text{Importance index} * \text{Gap index} * \text{Direction of development index}}$$

Formula 1: CFI mathematical formulation

The above Formula 1 is designed with purpose of finding the critical attributes for new resource allocations in the business processes, such as knowledge, technology, process, organizational and information systems. The smaller the CFI value is, the more critical the attribute means for a firm.

Ranta and Takala (2007) expanded the scope of CFI, becoming BCFI with Balanced view in the mathematical perspective, deriving from the Balanced Score Card framework (Kaplan and Norton, 2005). According to Liu & Takala, (2012) the main differences of BCFI and CFI model is by the changing in the formula by converting std{experience} index and std{expectation} index into SD Experience Index and Expectation Index. BCFI is more reliable and proper model that measures the most critical factors affecting the overall company's performance. BCFI measurement is the combination of two types of BSC (Balanced Score Cards) and operations questions. BSC questionnaire has 18 attributes to be measured, OP questionnaire has 21 attributes (Takala & Uusitalo, 2012). BCFI method consists of three separate phases; (i) business current assessment, (ii) business critical factors identification and measurement and lastly (iii) data analysis and application of CFI tools. The last phase comprises calculating the following indices for data analysis, according to the BCFI method:

$$\text{SD expectation index} = \left(\frac{\text{SD of expectation}}{10} \right) + 1$$

$$\text{SD experience index} = \left(\frac{\text{SD of experience}}{10} \right) + 1$$

$$\text{Performance index} = \frac{\text{Average of experience}}{10}$$

$$\text{Importance index} = \frac{\text{Average of expectation}}{10}$$

$$\text{Gap index} = \left| \frac{(\text{avg.of experience} - \text{avg.of expectation})}{10} \right|$$

$$\text{Direction of future/past development index} = \left| \frac{(b\% - w\%)}{100} \right|$$

The BCFI is calculated with the following equation, with values from the other indices:

$$\text{BCFI} = \frac{\text{SD expectation index} \cdot \text{SD experience index} \cdot \text{Performance index}}{\text{Importance index} \cdot \text{Gap index} \cdot \text{Direction of development index}}$$

The index is considered critical when their BCFI value is close to zero. If an attribute has a value significantly greater than others, it is also noteworthy. The separate indices can be weighted if there is need to emphasize them according to the prevalent (Nadler & Takala, 2010). The BCFI values are calculated individually for each attribute. The results are presented as a bar graph that shows the BCFIs for both past and future development side by side.

3.0 METHODOLOGY

The nature of this research is based on case studies in 3 involved countries, namely Finland, China and Malaysia. Companies selected are involved in furniture industries, manufacturing various products from chairs, tables, doors, modular cabinets, wardrobes, floorings and sofas.

In Finland, the University of Vaasa (UVA) is in close collaboration with TEAK OY Ltd., a center for training and production for selected furniture of such as chair and table. UVA provides TEAK with professional supports such as technical advice for production and operational efficiency. UVA scholars are also appointed as board members of TEAK.

In China, Wuhan University of Technology (WUT) engages industrial collaboration and consulting tasks with Shenyang Furniture Association (SFA), China. Scholars from UVA are also jointly collaborating in strategic research projects with WUT and SFA. Within SFA, it manages few industrial furniture sectors, such as floor manufacturing (parquet), kitchen cabinet manufacturing (panel, shelf), door manufacturing, modular manufacturing and sofa manufacturing.

In Malaysia, Universiti Tun Hussein Onn Malaysia (UTHM) is conducting case study research at MixBox (M) Sdn. Bhd., a furniture manufacturing company producing modular cabinets and wardrobe. UTHM and UVA are jointly conducting research at MixBox for industrial research based on strategic purpose for operation strategy and industrial effectiveness.

These case studies involve questionnaire distributions (Sense & Response of Operation [OP] and Balance Score Card [BSC]) to factory owner, managers, executives and technical staffs. Since it is a case study, there are few limited staffs, specifically 3-4 executive level people who are involved in this specific research project, due to time and exposure limitations. Questionnaires applied in this research are as follows;

- 1) S&R of Operation (OP) – based on parameters of knowledge & technology management, processes & work flows, organizational systems and information systems.
- 2) S&R of Balance Score Card – based on parameters of external structure, internal process, learning & growth, trust and business performance.

4.0 DATA ANALYSIS

This chapter presents results of a comparative study based on two furniture companies at two countries; TEAK OY from Finland and *Shenyang Furniture Manufacturers from China*. The purpose of this study is to evaluate business performance in the case companies through utilization of BCFI methodology and find possible similarities, like relationships with

customers, processes and possibilities for growth internally and externally. The study proposes to compare the results of the case companies with each other in a way to find similarities in critical areas, therefore to detect a possible trend of the furniture market development. The results were gained by utilization of two types of questionnaire for (B) CFI calculation. BSC (Balanced Score Cards) questionnaire is targeted on strategic holistic resources, and OP (Operations) questionnaire is enquiring holistic operational resources to be measured in different manners. BSC questionnaire has 18 attributes to be measured, OP questionnaire has 21 attributes.

Figure 2 demonstrates the results of *Finnish expectation versus experience* for TEAK OY from Finland. The presented below graphic reflects how the Finnish company's expectations match the reality and the actual experience. In average it is possible to note that expectations are bigger than experiences.

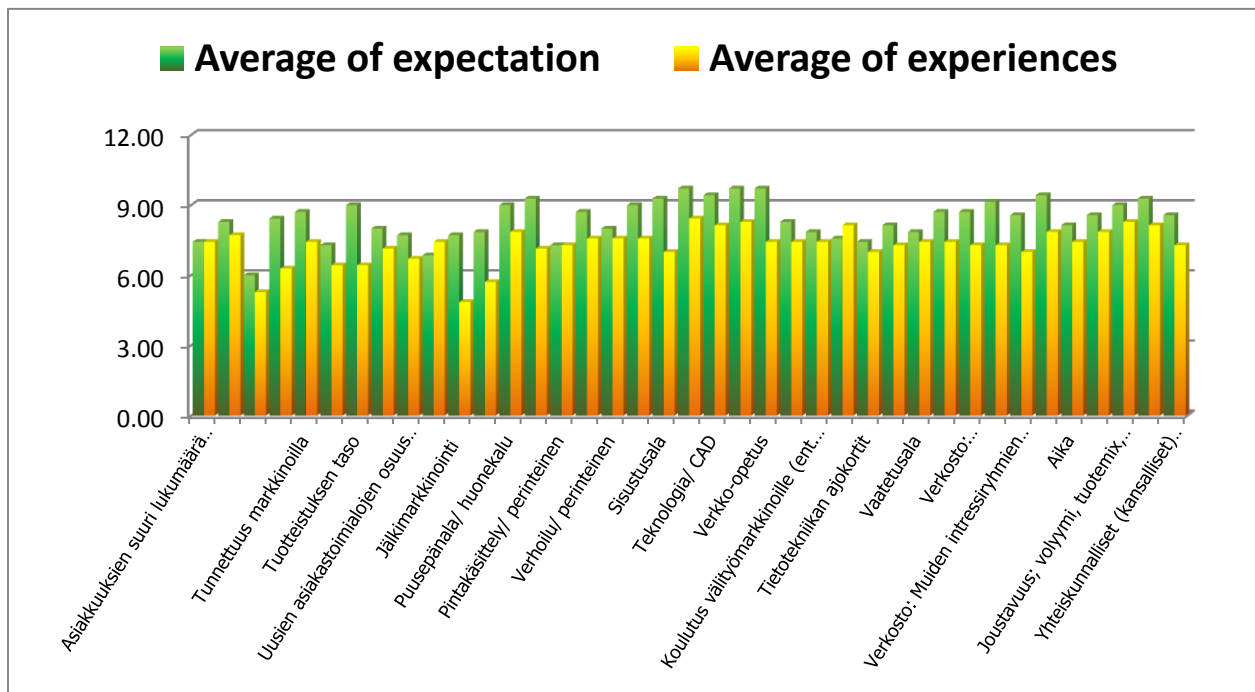


Figure 2: Finnish company expectation versus experience

The results confirmed that in many societies, including Finland, generally expectations (ideal) are higher than experience (real). Expectations on technology, CAD, robotics and automations are among the highest in furniture industry. This is because the impact of transition in the manufacturing sector from labor intensive production to capital intensive flexible specialization globally (Kromann & Skaksen, 2007). Accordingly, recent research done by Karabegovic, Karabegovic, & Husak (2012) have shown that Europe countries is the second highest countries in terms of number of robot applications in the world. Besides, the survey shows that the result is equally high on actual experience among respondents. However, there are gaps to be addressed on areas of designing completely new products and post-marketing, especially in Finland furniture industry. As argued by Szymanowski &

Olkowicz (2010) and (Berginc et al., 2011), furniture industries are the traditional sector with a low potential for product innovation because of high rate of segmentation in this sector makes it difficult to penetrate new segments through the development of new products. As such, to mend the gaps it is recommended that the Finnish furniture players to engage in BPR (business process re-engineering) by allocate resources on ‘listening to markets’. The ignorance of the market and customer in the products development process is very problematic in the furniture industries (Berginc et al., 2011). In turn, this could lead to tapping more potentials / ideas / innovations for creating new products/design from market platform, then to design table). Indeed, furniture sectors belong to industries which require less time for product development (2-6 months) (Szymanowski & Olkowicz, 2010) , therefore, BPR activities is the appropriate solution.

Meanwhile, in Figure 3 demonstrates the results of CFI (BSC) calculation for TEAK OY Company. Both red and yellow attributes belong to the extremes and should be considered as critical or potentially critical. The following graphic demonstrates how the attributes change in certain period of time (from 2008 till 2015).

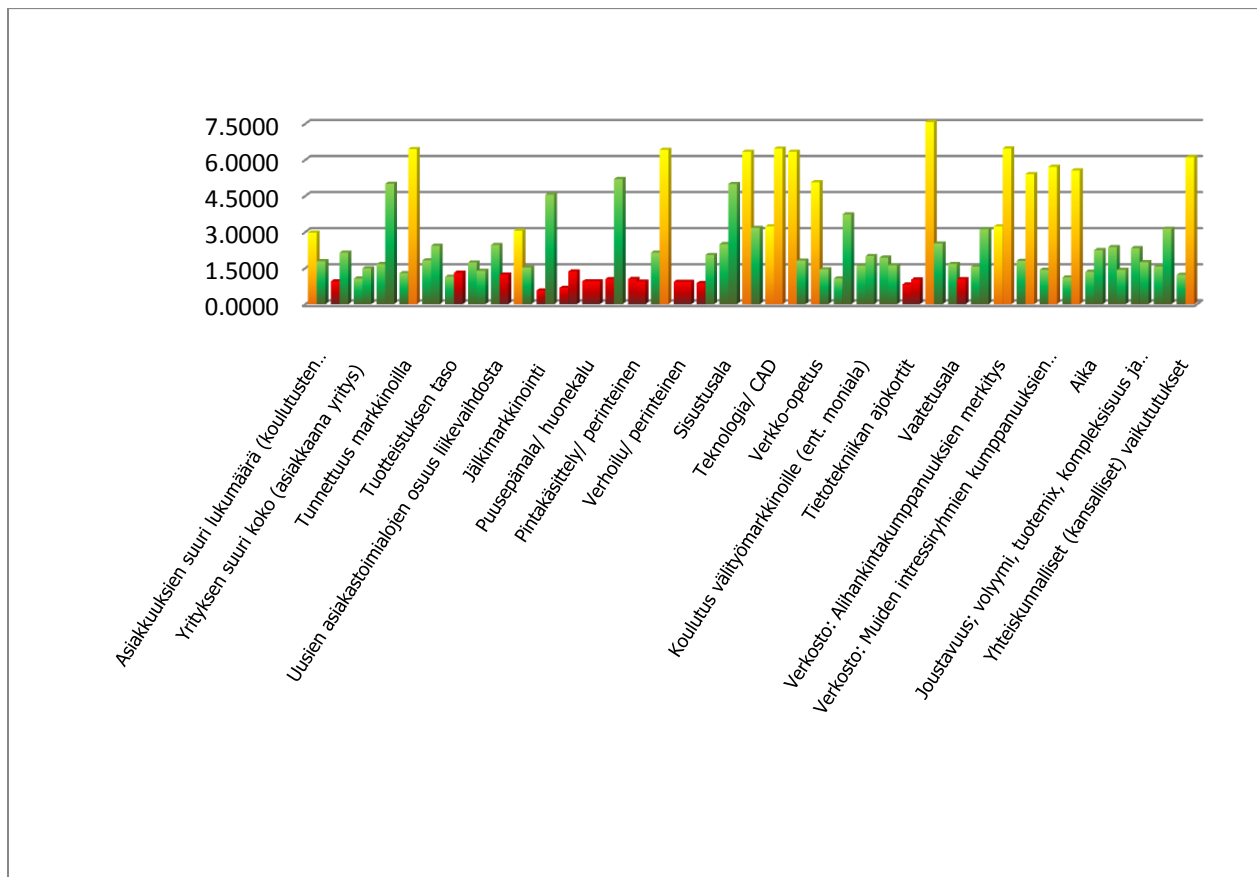


Figure 3: BCFIs Analysis (2008-2015)

To conclude, in Finnish furniture industry, technology/CAD is at core-spearheading /middle-to-high level, signifying a strong existing presence of technical-based applications and implementation. Additionally, awareness of education sector and interior design are significantly high, strongly growing and prevalent among industrial respondents. However, there is lacking of furniture technical licensing ability and capability for designing completely new products (based on limited samples). As such, in general qualitative observation and organizational trend, Finnish furniture player/s are seen as relatively *hesitant* to enter export / global market; though they are locally strong, foundation-wise, in Finland. Arguably perhaps, such trend is due to lacking of internal mass / numbers and external branding/marketing drives (observer opinion).

In the context of China furniture industries, Shenyang Furniture Manufacturers has been selected in the study. Shenyang Furniture has five branches. The company manufactures kitchen cabinet, door, modular, sofa and floor. China is well known as the world's second largest furniture exporter behind Italy. Nonetheless, almost the same characteristics with Finland industries, Chinese furniture companies are relatively conservative towards new product innovation by demonstrating preferences for incremental improvements rather than radical changes (Cao, 2004).

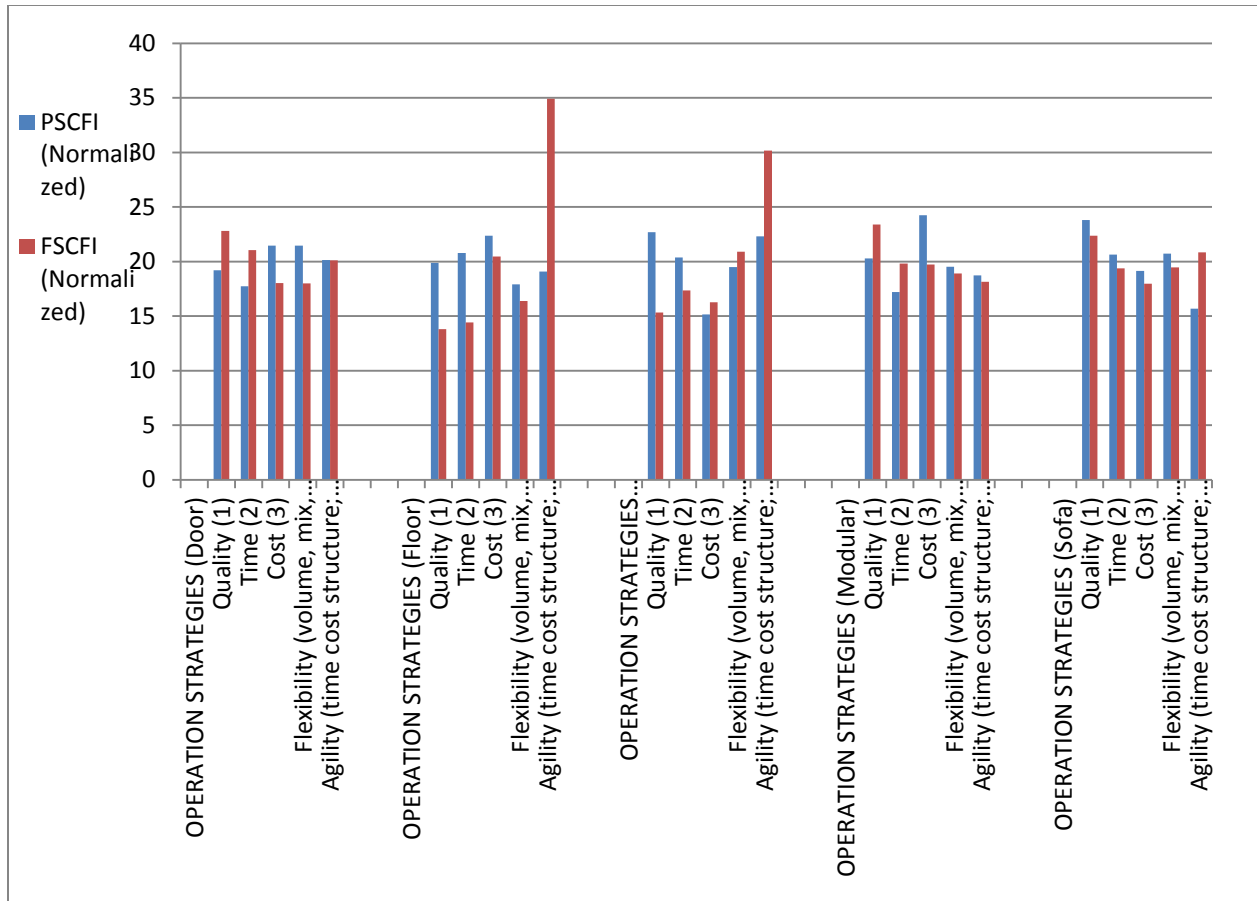


Figure 4: The attributes criticality in Operation Strategies of five branches

Figure 4 illustrates the critical attributes in operation strategies of five Shenyang Furniture branches. By the past and future indicators, costs and flexibility are the two most critical attributes in Operation Strategies providing the significance that these attributes should be focused strategically by the Chinese manufacturers in seeking technical assistance. China is well known of low-cost production manufacturer with focus more towards domestic market product. China manufacturer needs to have product flexibility and process flexibility. In recent years there has been an increasing degree of adoption of flexible manufacturing systems. According to Venieris & Cohen (2008), the perceived benefits of flexible manufacturing have been identified as smaller inventories of work in progress, faster production processes, improved response to customer needs, stable product quality, decreased finished goods inventories and decreased production costs per unit. There is a distinguish difference between the past and future indicators in Shenyang Floor manufactory branch, more observation / study is suggested with importance to characterize opportunities and uncertainties.

In sum, the Decoration Industry, Textile Industrial and Technology of CNC, Robots, Automation are considered as the most critical attributes for Shenyang door manufactory and hence, requiring retraining focus by the management. The upholstery, the Technology

of Robots, Automation and CAD are the most critical attributes to Shenyang floor manufacturers and the management must allocate resources for for technical/external support. The technology of Robots, Automation and CAD and the New Customer Share of Sales are considered as the most critical attributes for Shenyang Modular manufacturers and new allocation of resources is expected to meet future trend.

The reciprocal movements between operations strategy and S&R allocations for SCAs seem to work. *The directions in the changes basing on Basic, Core and Spear Head technologies and SCA analyses are according to interviews correct. Even the variability coefficients in technology rankings-- seem mostly to be acceptable (below 1). Validation of the models for T&K effects to SCA needs further studies have many challenges.* The (B)CFI extension by T&K effects is at quite an early stage of development. *It, and some of its modifications like SCFI for small samples, has been validated only in some case companies by now.*

Figure 5 demonstrates the results of Malaysia’s expectation versus experience of MixBox (M) Sdn. Bhd. from Malaysia. The presented below graphic reflects how the Malaysian company’s expectations match the reality and the actual experience.

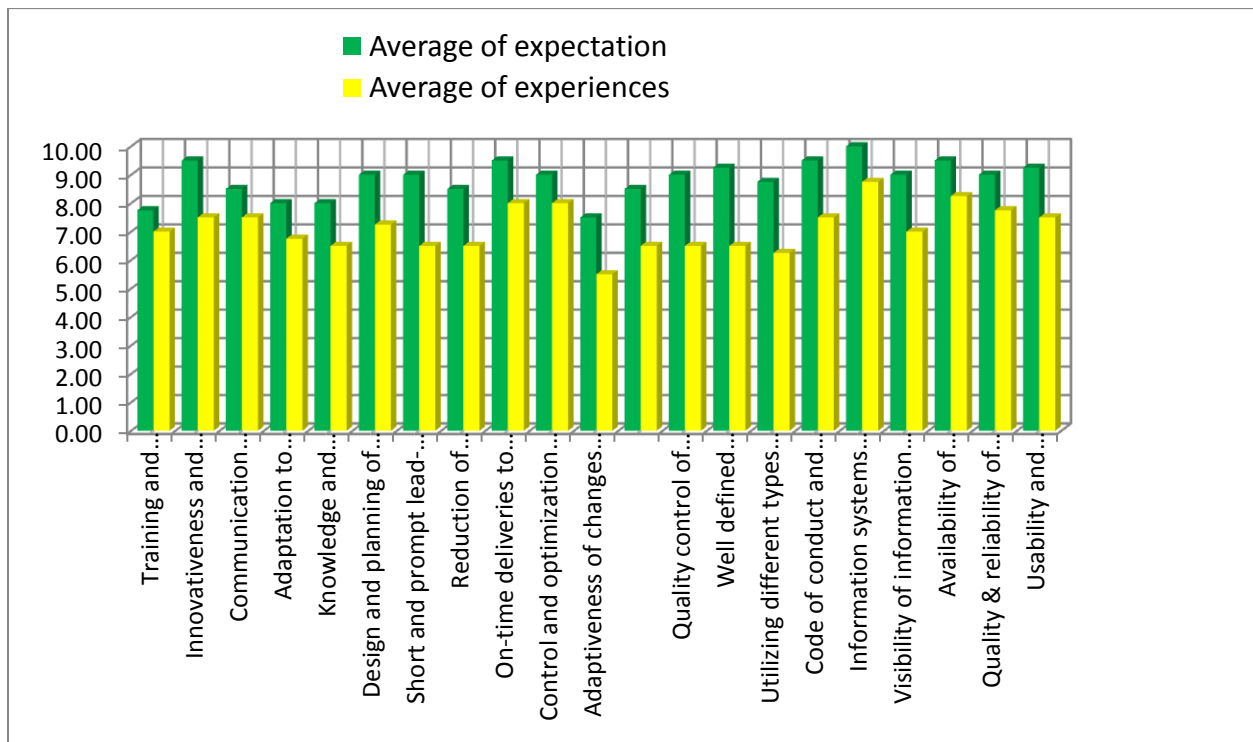


Figure 5: The S&R parameters of Malaysian firm, expectation against experience

Figure 5 generally depicts the fact that expectations have been higher than experience in all 21 parameters being measured from training until usage and functions of information systems. This signifies normal environment of many organizations in which employees are expecting better working environment in terms of facility, working condition, technology, management and even leadership. There has been a highest expectation and dependence

on information system that could support business processes in MixBox Furniture (M) Sdn. Bhd. However, based in the findings, there has been slightly lower expectation on the ability of the company to adapt and absorb changes in managing demand and order, especially those of ad-hoc nature. As such, it is advised that the MixBox management to establish or initiate a project leading towards establishing well-defined job specifications among its many departments. Under such a circumstance, it is suggested that the management to allocate more resources on technology, marketing/branding and employee training.

Figure 6 shows a Balanced Critical Factor Index illustrations of business functions in future at MixBox operations. It can be suggested that Production management needs to allocate resources on controlling and optimizing inventories, hence empowering delivery. In future, high stake allocation for more efficient information system to improve internal business processes. However, there also exist demanding attention to allocate resources on enhancing communications among departments, strengthening leadership and management system and improving working ethics and data security.

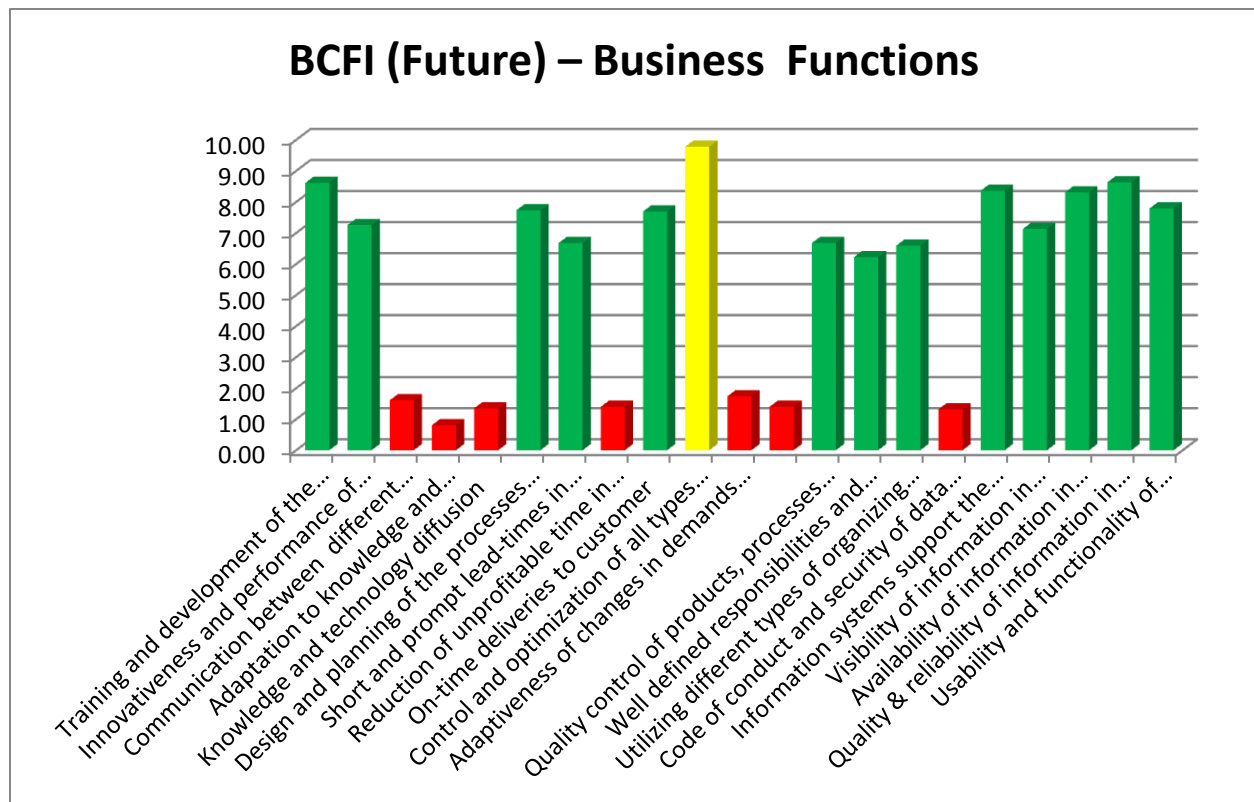


Figure 6: The BCFI analysis in future for business functions in Malaysian firm

The Malaysian firm BCFI past outlook could be seen from these perspectives of quality (Q), cost (C), time (T) and flexibility (F), as shown in Table 1 below. Statistically, it shows that MixBox had higher sense Time (T), being timely and on-time delivery; which with highest index of 0.38. This implied that this firm was agile and responsive with customer requests and willing to response to short-notice orders.

| BCFI (Past) | | | |
|-------------|----------|----------|---------|
| Q | C | T | F |
| 0.24 | 0.23 | 0.28 | 0.25 |
| 0.32 | 0.31 | 0.38 | 0.25 |
| Prospector | Analyzer | Defender | Reactor |
| 0.90 | 0.99 | 0.90 | 0.90 |

Table 1: The indices for BCFI past outlook

Based on RAL model perspective, figure 7 shows the Malaysian firm based on prospector, defender and analyzer Triangle. This triangle posits that MixBox was in the “Analyzer” mode, in the past, with index of 0.99. It was shown that MixBox had been applying a strategy to strike balance among quality, cost and time, in the past.

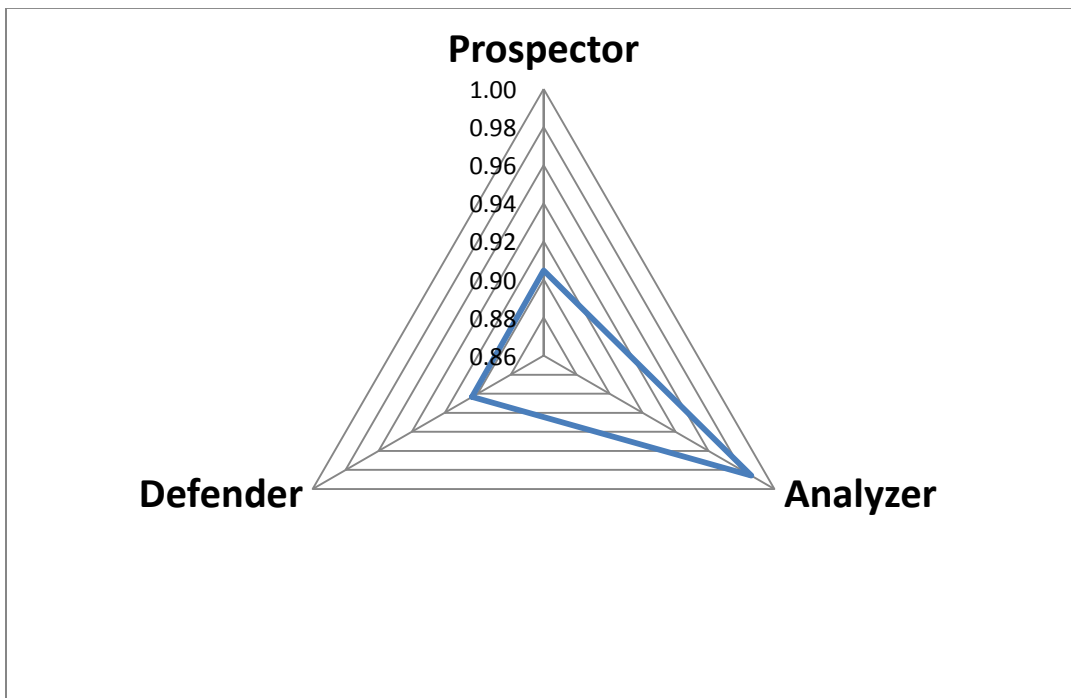


Figure 7: The BCFI past outlook of MixBox, being an Analyzer

However, the Malaysian firm BCFI future outlook can be seen from perspectives of quality (Q), cost (C), time (T) and flexibility (F), as shown in Table 2 below. Statistically, it shows that now, MixBox has higher priority on quality (Q). In the coming years, Mixbox aspires to have higher sense and importance to meet and exceed customers' expectation. This requires the firm to be highly lean and more responsive.

| BCFI (Future) | | | |
|---------------|----------|----------|---------|
| Q | C | T | F |
| 0.35 | 0.11 | 0.29 | 0.26 |
| 0.47 | 0.15 | 0.38 | 0.26 |
| Prospector | Analyzer | Defender | Reactor |
| 0.92 | 0.91 | 0.89 | 0.90 |

Table 2: The BCFI Future Outlook for MixBox

Figure 8 shows that RAL model classifies MixBox as “Prospector” in future, in which the firm strives to be more innovative in serving the market.

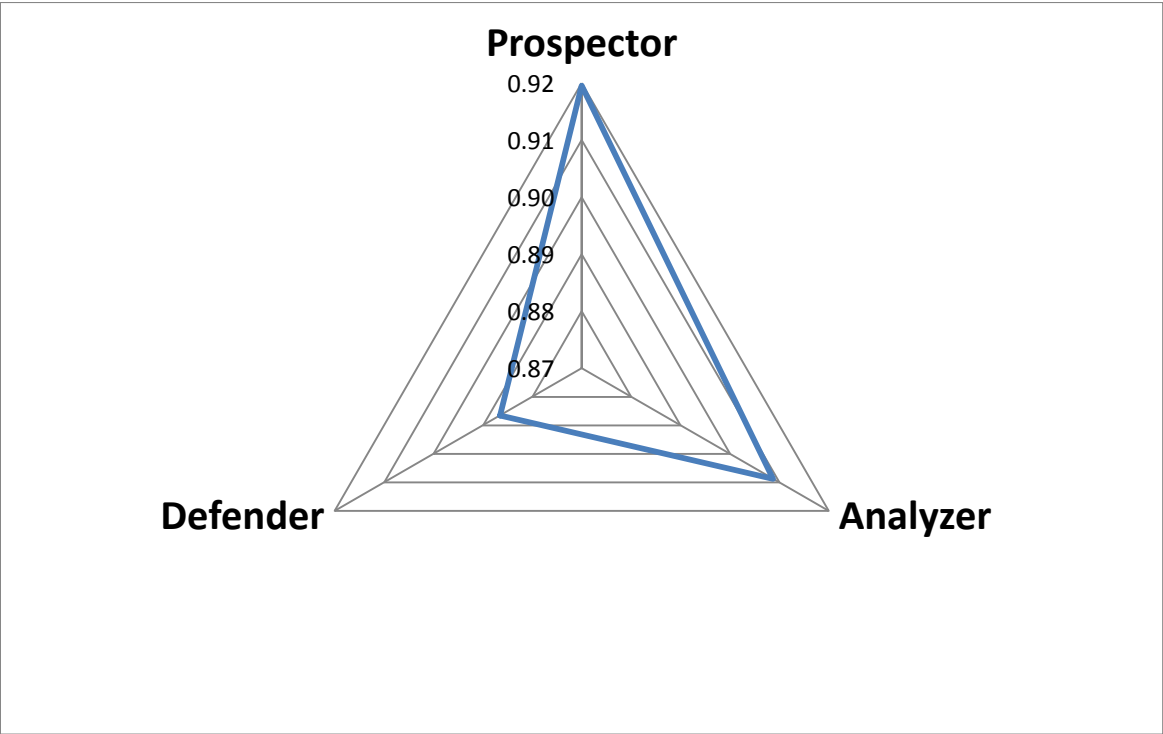


Figure 8: The BCFI future outlook of MixBox, being a Prospector

5.0 SUMMARY

Generally, it can be summed up that the research has come-up with answers for its research questions. Based on SCA profiling, TEAK OY Ltd. Of Finland has been highly established and intensive in terms of technological-based performance in furniture manufacturing industry. Finland, with 6 million population, has the high-end on technology, however, it is relatively local-oriented. For the sake of full optimization of world's resources, Finland could export furniture-based technology to Chinese and Malaysian furniture firms to have a win-win impact on the global scales. In addition, China with 1.4 billion population, has the advantage on cost and agility, however requiring high-technology support to fulfill vast local market and export further worldwide. Last but not least, Malaysia with 28 million population, has advantage over cost, quality and delivery, however, requiring technology to enhance innovation, in order to broaden niche market for niche market, especially for the Middle East countries.

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