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USING SUSTAINABLE COMPETITIVE ADVANTAGES TO MEASURE TECHNOLOGICAL OPPORTUNITIES

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Abstract
The goal of this paper is to help small and medium size enterprises (SMEs) to find operative competitive advantage. This paper introduces a new method which applies critical factor analysis, risk and opportunities analysis to measure and propose resource allocation for companies in couple of next years. this research shows Knowledge/Technology (K/T) Calculation effect on (Balanced) Critical Factor Index (CFIs) depending on the proportions allocated among the different technological levels (Basic, Core or Spearhead) for each attribute separately. Moreover it helps firms to take balance in resource allocation for each attribute in changing environments on the basis of different level of technology. This paper presents the 'first in the world' case study on operative sustainable competitive advantage and corresponding risk levels by taking into account technology and knowledge effects for 7 SME companies.

Keywords
sense and response methodology, sustainable competitive advantage (SCA) model, risk level, knowledge and technology (K/T), Oulu South region, small- and medium-sized enterprise (SME).

Introduction

The world is changing every day and this unstable situation influences on business in huge scale. Among this turbulent environment, operation strategy is one of the most essential tools which can helps manages to save their position or even get more share in global market. According to [1] "The future competitiveness of manufacturing operations under dynamic and complex business situations relies on forward-thinking strategies". In fact, companies should have multifocused strategy at the same time and try to consider competitive priorities consist of time, quality, cost and flexibility according to market analysis.

Sustainable competitive advantages (SCA) notion was defined by Porter in 1985 for the first time and it has evolved slowly from then [2]. In 1991, Barney completed it as: A firm is said to have a sustained competitive advantage when it is implementing a value creating strategy and when these other firms are unable to duplicate the benefits of this strategy [3].

Later in 2001 Barney introduced SCA as a resource base theory. The idea behind resource based strategy is that if a firm is to achieve a state of SCA, it must acquire and control valuable, inimitable, rare and nonsubstitutable resources [4].

Knowledge and Technology is included in sense and respond questionnaire to calculation SCA levels because it provides some opportunity for firm.

This research answers two questions: 1. How K/T calculation effect on operative SCA?. 2. How to interpret the results from CFIs, SCA level and K/T calculation?

This paper starts with a short literature review to the topic and some background information about the case companies. Then general results of including K/T factor on SCA risk level are presented. Next part focus on the results of weak market test (WMT). Then Company E which shows good condition according to WMT is investigated in detail. Finally, discussion about the questions and conclusion are presented.

Theory background

Manufacture strategy

Reference [5] defines strategy as "the pattern or plan that integrates an organization's major goals, policies and action sequences into a cohesive whole". A well-formulated strategy helps marshal and allocates an organization's resources into a unique and viable posture based upon its relative internal competences and shortcomings, anticipated changes in the environment, and contingent moves by intelligent opponents. From then, the concept of strategy evolved in such a way that nowadays this concept; also include a corporate social responsibility and new models of leadership [6]. It should be mentioned here that there is a significant different between corporate strategy and business strategy. In fact, corporate strategy means overall business portfolio, acquisitions, divestments, joint ventures and major reorganizations while business strategy defines single business or product line strategy. Figure 1 shows the differences between these two concepts [7].

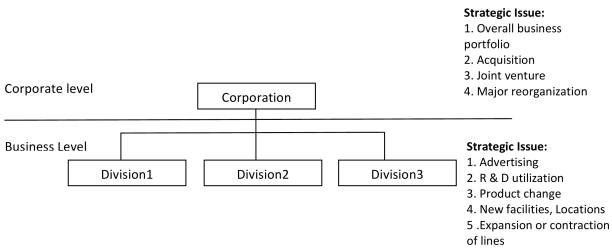

Fig. 1. Hierarchy of corporate and business level strategies [7].

A long with the strategy definitions, several archetypes or topologies have been proposed to define the decisions and directions that managers implement in their organizations.

On of the most famous strategy topology is defined by Michael Porter in year 1980. In his model, he defines three generic enterprise strategies as: 1. Overall cost leader ship, 2. Differentiation, 3. Segmentation [2].

Another famous strategy topology is defied by Miles and Snow. Miles and Snow's competitive strategies divide the business strategies on to four groups:

1. Defender: concentrates in a mature product or market operation. This type of strategy focuses on efficiently and prefers not to take risk. In this type of strategy company tries to strengthen efficiency and maintain their current costumers.

2. Prospector strategy: looks forward to new opportunities in market. This strategy is dynamic and tries to innovate in processes and take risk. Besides, this type of strategy focus to lead it's industry.

3. Analyzer strategy: is placed between the defender and prospector strategy and tries to conserve a steady state in market.

4. Reactor strategy: is no-strategy and happens in absence of defined goals and objectives. In this type of strategy, decisions are taken to respond immediate problems as there is no sense of direction [8].

According to [7] the choice between these alternatives depends on the current product life cycle and how does the management interpret the external environment. There are three main problems, which drives the companies to make decisions among these possibilities: Entrepreneurial, engineering, and administrative problems.

Reference [9] introduced a technology path for different technology level. This model is completed by Takala later. The idea behind this model is that when a company starts to sell its product. It moves from Technology specialist to commodity partner product, collaboration and problem solver step by step. This concept shows in Fig. 2 [10].

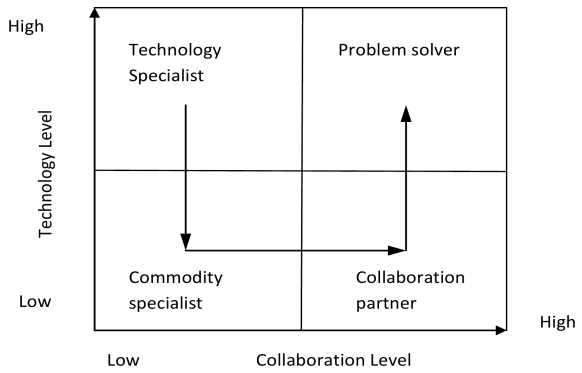

Fig. 2. Technology path.

A manufacturing strategy based on a business strategy includes three objectives: competitive priorities, manufacturing objectives and action plans.

In other words, first competitive priorities for a company are defined. Then, regarding to competitive priorities manufacturing strategies are defined. Finally in last step, suitable action plan to achieve strategic goal is defined and implemented. Figure 3 shows this process model [11].

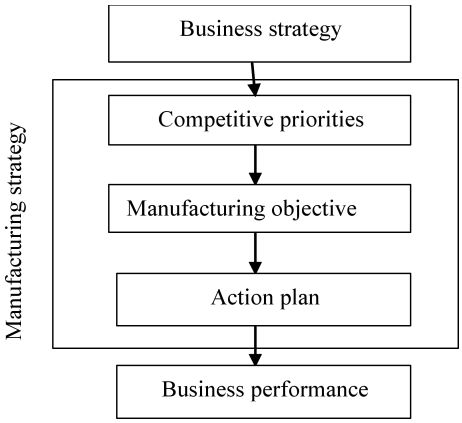

Fig. 3. Process model of manufacturing [11].

Resources based view of the firm

Reference [4] suggests sustainable competitive advantages as a resource- based strategy. The core concept behind resource based strategy is that if a firm is to achieve a state of SCA, it must acquire and control valuable, rare, inimitable, and nonsubstitutable resources. Moreover, this firm should have an organization can absorb and apply them [12]. Technology as know-how, is a relevant part of resource based strategy [13].

Reference [14], suggests that analyzing a firm from the resource side has more benefit rather than from the product side. In fact, he believes that the resources and the product should be taken to account at the same time and finding optimal product market activities is possible by specifying a resource profile for a firm.

Methods

AHP, Sense and respond, CFIs

AHP method is used in this research paper to pairwise comparison. According [15], "The Analytic Hierarchy Process (AHP) method is a multi-attribute decision instrument that allows considering quantitative, qualitative measures and making trade-offs".

The sense and respond (S&R) model is used to help in dynamic decision-making to describe, evaluate, benchmark and optimize lower level resource allocations to meet the performance requirements in all the interest groups inside and outside the organization and in turn to improve higher level strategies.

The critical factor index (CFI) method is a measurement tool to indicate which attribute of a process is critical and which is not, based on the experience and expectations of the interviewees. The S&R model has gone through three stages of development, which are called CFI model, BCFI model, and SCFI model.

Manufacturing strategy

The analytical models for manufacturing strategy are used to calculate the operational competitiveness indexes of companies in different competitive groups, namely prospector, analyzer and defender.

The manufacturing strategy index (MSI) is modeled based on the multi criteria priority weights of Q (Quality), C (Cost), T (Time/delivery) and F (Flexibility), as function $\mathrm{MSI} = f_{\mathrm{MSI}}(Q, C, T, F)$. Figure 4 shows different position of a firm considering operation strategy. In this picture, prospectors are constantly seeking for new market and product innovations. They create instability in the market. Prospectors are concentrating in quality so they are not as cost-effective as defenders. Analyzers work both static and dynamic markets. In static markets they seek to operate as cost-effective as possible and in dynamic markets they are observing their competitors and try to adapt most promising ideas. Defenders work at narrow market areas and they have narrow product portfolio. They are also concentrated to intensify their existing processes and they don't seek new product and market innovations.

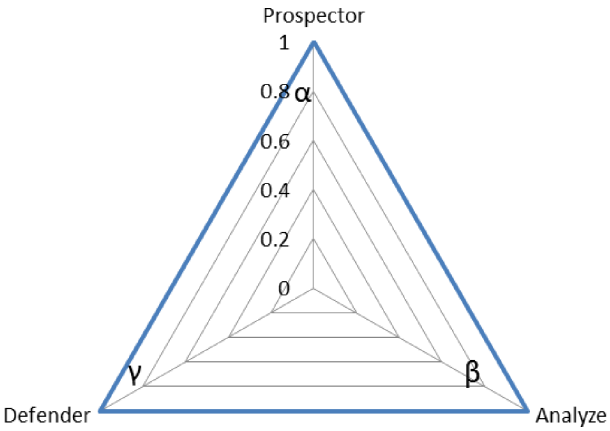

Fig. 4. Manufacturing strategy [10].

SCA, MAPE, RMSE, MAD

Sustainable competitive advantage (SCA) is the measurement of risk level for that the operation strategy should be improved to sustain the opera-

tion competitiveness during the period considered. There are three indexes, which are MAPE, RMSE and MAD, to measure the risk level of the operation strategy for sustainable competitive advantages in this paper.

Technology Rankings, BCFI K/T

Knowledge/Technology (K/T) requirement section has been added to the S&R questionnaire to gather information about the companies' knowledge/technology rankings. Basic technology is referring to technologies commonly used and that can be purchased or outsourced, Core technology is referring to company's current competitive technologies and Spearhead technology is referring to the technologies focused on the future. Each attribute in the list is numbered and analyzed in graphs with respect to the order. The importance of different technological levels (Basic, Core or Spearhead), in technology-based businesses, affects a lot the strategy implementation by the knowledge required, and supports the company's success in the competitive category chosen. The attributes are assigned to one of the multiple key categories of RAL model Quality (Q), Cost (C), Time/Delivery (T) and Flexibility (F), depending on their most significant effect.

Case introduction, Oulu South region

Oulu South Area is located in Northern Ostrobothnia in the southern part of the province of Oulu. It has three sub-region area of cooperation. The area includes a total of 14 municipalities with a total population of just under 90 000, or about a quarter of the Northern Ostrobothnia population. In 2001, Oulu Southern Regional Ministry of the Interior approved the regional center program three sub-region network-type cooperation area. The region's development strategy has been prepared in Oulu South 2015 agreement. The contract shall be entered in the main area of development in 2007–2015.

Oulu South is one of the main agricultural areas – the area can be characterized as an industrialized in rural areas, because the region offers a significant extent, the manufacturing industry jobs. The largest industries are agriculture, metals, wood products industry, and information and communication technology (ICT). The regional unemployment rate is among the lowest in northern Finland and the age structure of the population is young. This differentiates from other Finnish Oulu Southern rural areas. Oulu South is a business-friendly area where currently about 4,600 active companies. Of these, about 95% of companies are micro-enterprises.

Data collection procedures

Research questions investigations is based on Seven case studies from Oulu region of Finland, from each case company; at least 2 respondents are interviewed. Only in one case company (C), one respondent is interviewed. So for this company, calculation of some index like CFI is not possible.

The data of case company are collected by asking managers or people from managements group to answer the questionnaires from different departments. The interviewees are normally decision makers and middle management groups in the case company, who understand the operations of the company, and the number of informants is dependent on the size of the case company. For conduction this research, interviews were carried out in the companies during face to face meeting or by phone. The data which are used in analysis are mainly collected sending the S&R questionnaire via email. The interviewed high competence experts should be representative to know well the operations of the studied case company.

Results

SCA risk Value for Oulu South region (Past)

Table 1
SCA risk Value – Company A.

A	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.95	0.96	0.97
BCFI	0.88	0.92	0.94
SCFI	0.87	0.92	0.94

Table 2
SCA risk Value – Company B.

B	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.95	0.96	0.97
BCFI	0.88	0.92	0.94
SCFI	0.87	0.92	0.94

Table 3
SCA risk Value – Company C.

C	SCA risk Values		
	MAPE	RMSE	MAD
CFI			
BCFI	0.94	0.96	0.97
SCFI	0.92	0.95	0.96

Table 4
SCA risk Value – Company D.

D	SCA risk Values		
	MAPE	RMSE	MAD
CFI	1.00	1.00	1.00
BCFI	0.95	0.97	0.97
SCFI	0.91	0.94	0.95

Table 5
SCA risk Value – Company E.

E	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.90	0.94	0.95
BCFI	0.87	0.92	0.93
SCFI	0.90	0.94	0.95

Table 6
SCA risk Value – Company F.

F	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.98	0.99	0.99
BCFI	0.91	0.94	0.95
SCFI	0.92	0.95	0.96

Table 7
SCA risk Value – Company G.

G	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.90	0.94	0.95
BCFI	0.88	0.92	0.94
SCFI	0.89	0.92	0.94

According to the above tables, almost all the risk levels are less than 0.10 which means that the company operation strategy is sustainable. Only in three cases (one from Case A, one from Case B and two from Case G) risk level is a little more than 0.10 which is not significant considering all the good results.

SCA risk level in future considering K/T

Table 8
SCA risk Value – Company A.

A	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.88	0.93	0.94
BCFI	0.98	0.99	0.99
SCFI	0.98	0.99	0.99
BCFI T/K	0.80	0.88	0.90

Table 9
SCA risk Value – Company B.

B	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.88	0.93	0.94
BCFI	0.98	0.99	0.99
SCFI	0.98	0.99	0.99
BCFI T/K	0.80	0/88	0.90

Table 10
SCA risk Value – Company C.

C	SCA risk Values		
	MAPE	RMSE	MAD
CFI			
BCFI	0.94	0.96	0.97
SCFI	0.93	0.95	0.96
BCFI T/K	0.94	0.96	0.97

Table 11
SCA risk Value – Company D.

D	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.96	0.97	0.98
BCFI	0.91	0.95	0.96
SCFI	0.95	0.97	0.97
BCFI T/K	0.90	0.94	0.95

Table 12
SCA risk Value – Company E.

E	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.88	0.93	0.94
BCFI	0.88	0.93	0.94
SCFI	0.84	0.90	0.92
BCFI T/K	0.83	0.92	0.92

Table 13
SCA risk Value – Company F.

F	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.83	0.90	0.91
BCFI	0.97	0.98	0.98
SCFI	0.97	0.98	0.99
BCFI T/K	0.94	0.96	0.97

Table 14
SCA risk Value – Company G.

G	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.76	0.85	0.89
BCFI	0.79	0.87	0.90
SCFI	0.79	0.87	0.90
BCFI T/K	0.81	0.88	0.91

According to all the tables above, calculating K/T affects the risk levels. Means that considering K/T factor dose not reduce SCA risk level. In more details, in four cases company contain A, B, D and F the SCA risk level increased after adding K/T factors. In C and G Company the risk level decreased but it is not significant and In case E, SCA risk level stays almost unchanged after adding K/T factor.

Weak Market Test (WMT)

Apart from company A and D, WMT is conducted for all the companies and the results are as follow:

Company B: which focus on Electronics and software devices and WMT shows there is no contradiction with the situation in the operative level. The main concern of the company is uncertainty and challenges with the general manager and owner ship.

Company C: produces Sawmill and the results of WMT is as Sawmill. The results are very exact. Moreover this method brings something new for company which is able to verify the roots of decision making capabilities.

Company E: manufactures sports goods and the WMT demonstrates extremely good results which fit the findings within Operations strategy and sustainable competitive advantage.

Company F: produces mechanical wood products and according to WMT, the results of method are acceptable for them.

Company G: focus on Automation for mechanical wood industry and civil engineering. The results are as expected. In this company operation production managements are too depend on manager and he justifies their pre-understanding in a useful manner.

The results of CFIs and T/K calculation for Company E in detail

As company E shows a good condition according to weak market test, in next parts the analysis of CFIs and T/K calculation are explained:

Expectation vs experience

Figure 5 demonstrates the comparison between the experience and expectation of the respondents. According to this figure the average of expectation is more than the average of experience and it means that the company plans to improve the level of different criteria for future. Critical Factor Index (CFIs), Operation Priorities.

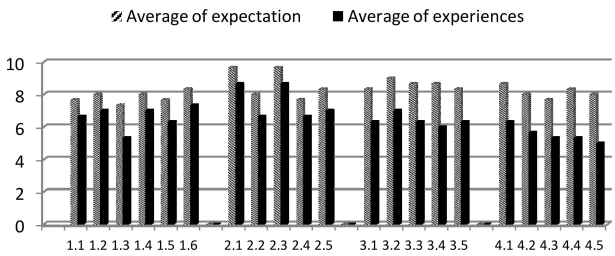

Fig. 5. Detection of the attributes for future competitiveness.

There are three different colors defined for the resource allocation of the attributes: red, yellow and green, which represent whether an attribute is under resourced, over resourced or balanced. Here the resource allocation of the attributes is considered to be ideal if it is equally distributed. The whole resource is counted to be 100% and it is divided to the total number of attributes. By this division the average resource level is defined. An attribute is counted to be balanced and takes the green color if CFIs value is between the range of 1/3 and 2/3 of average resource level.

For the rest, any attribute which has a lower CFIs value than 1/3 of average resource level is counted to be under resourced and takes the red color, and any attribute which has higher CFIs value than 2/3 of average resource level is counted to be over resourced and takes the yellow color [16].

Figure 6 shows critical factor index in terms of CFI for future. According to this bar chart, only four attributes are balance resource (the black ones) and sixteen attributes are critical resource (over resources or under resources) in CFI (OP) figure.

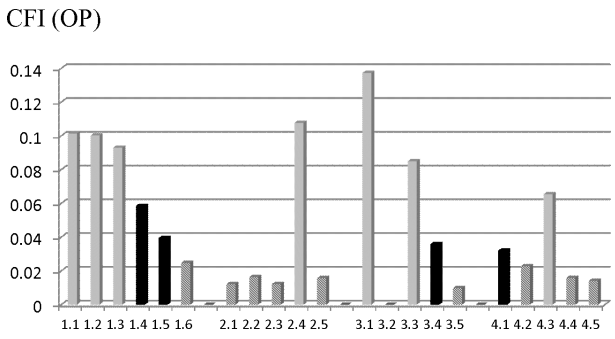

Fig. 6. Critical Factors (Operations Priorities).

Figure 7 shows critical attribute in terms of BCFI. Bar chart shows that three attributes are over (bars with lighter color) and four attributes are under resource (bars with stranger color) in BCFI (OP) figure.

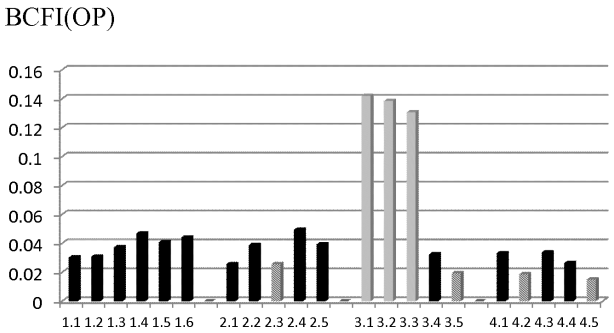

Fig. 7. Balanced Critical Factors (Operations Priorities).

Figure 8 shows critical attribute in terms of SCFI calculation. It shows that five attributes are over and seven attributes are under resource in SCFI (OP) figure.

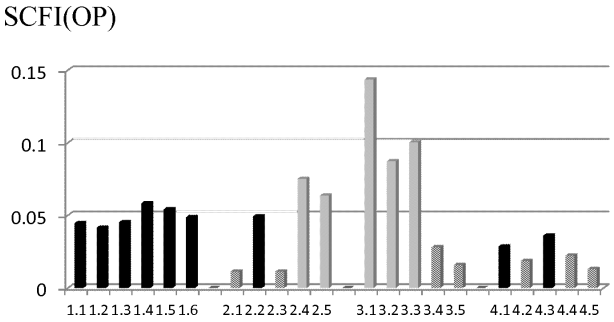

Fig. 8. Scaled Critical Factors (Operations Priorities).

SCA calculation

In Table 15, the PAD (prospector, Analyzer, Defender) values for both past and future competitive strategy are calculated based on CFI. In past strategy, the PAD values are: 0.89 for prospector, 0.93 for analyzer and 0.92 for defender. In future strategy, the PAD values are 0.89, 0.94 and and 0.91 for prospector, analyzer and defender respectively.

Table 15
SCA value (CFI).

E	SCA Values		
	Prospector	Analyzer	Defender
Past	0.89	0.93	0.92
Future	0.89	0.94	0.91

In Table 16, PAD values for both past and future competitive strategy are shown based on BCFI. In past strategy, PAD values are 0.90 for prospector, 0.96 for analyzer and 0.92 for defender. In future strategy, the PAD values are 0.91, 0.95 and 0.91 for prospector, analyzer and defender respectively.

In Table 17, PAD values for both past and future competitive strategy are shown on the basis of SCFI. In past strategy, PAD value for prospector is 0.89, for analyzer is 0.94 and for defender is 0.92. In future strategy, the PAD value for prospector is 0.90, for analyzer is 0.98 and for defender is 0.91.

Table 16
SCA value (BCFI).

E	SCA Values		
	Prospector	Analyzer	Defender
Past	0.90	0.96	0.92
Future	0.91	0.95	0.91

Table 17
SCA value (CFI).

E	SCA Values		
	Prospector	Analyzer	Defender
Past	0.89	0.94	0.92
Future	0.90	0.98	0.91

In Table 18, the SCA risk level (for past and without the effect of K/T) is measured by the MAPE, RMSE and MAD based on the CFI, BCFI and SCFI

Table 18
SCA Risk Level (past).

E	SCA Values		
	MAPE	RMSE	MAD
CFI	0.90	0.94	0.95
BCFI	0.87	0.92	0.93
SCFI	0.90	0.94	0.95

In Table 19, the SCA risk level (for future and including the effect of K/T) is measured by the MAPE, RMSE and MAD based on the CFI, BCFI and SCFI.

Table 19
SCA Risk Level (Future).

E	SCA risk Values		
	MAPE	RMSE	MAD
CFI	0.88	0.93	0.94
BCFI	0.88	0.93	0.94
SCFI	0.84	0.90	0.92
BCFI T/K	0.83	0.90	0.92

Knowledge and Technology (K/T) effect

In general the company's current competitive technologies (Core Technology) seem to be around 40%, the technologies commonly used (Basic Technology) are around 40% and the technologies focused on the future (Spearhead Technology) are around 20% for most of the attributes (Fig. 9). From technology rankings point of view the company is found to be competitive one and aims to follow a positive slope in case of technology as it is aiming to improve it in future case.

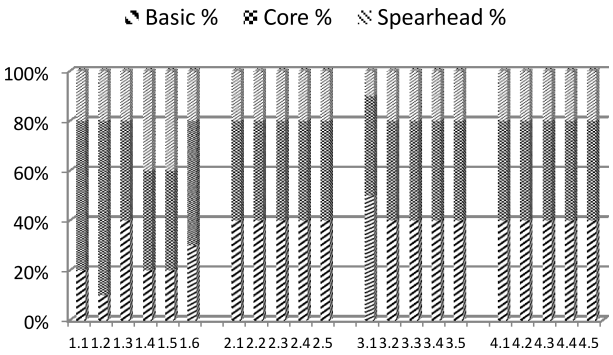

Fig. 9. Technology and Knowledge.

In Fig. 10, the left bars represent the knowledge/technology based BCFI values and other bars stand for traditional BCFI values. From the technology point of view, the attributes number 2.2, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4 seen to be over resourced in terms of BCFI T/K, these attributes are observed to be less critical compared to BFCI values, for some attributes are more critical.

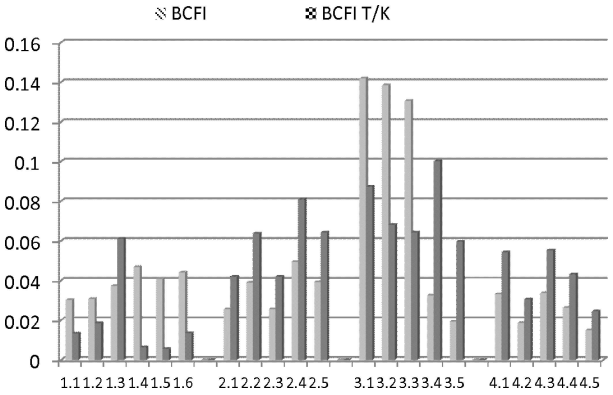

Fig. 10. BCFI and BCFI T/K.

Discussion

Conducting this research shows knowledge and technology effect on SCA risk level but not to a fixed direction. In fact, there is need for more studies to conclude whether K/T calculation decreases the SCA risk level or not. Among these seven case companies, SCA risk level remains unchanged including K/T factor in case of company E. For case C and G risk level decreases a bit but it is not significant. And in case of A, B, D and F risk level increases after including K/T.

Investigation of case company E in detail obtained the following results: 1. including K/T in BCFI calculation dose not guide attribute to specific direction. In fact, level of some resources increase after including K/T factor and for others decrease. 2. Company E strategy is sustainable because there is no significant different between PDA values in past and in future. The company position is Analyzer in past and it remains unchanged in future.

Conclusion

In summary, SCA studies are essential for companies as it uses S&R method to find critical factor index. Using S&R method enable companies to understand business situation better and react fast and more precise. Besides SCA method ensures that the different resources of the companies are operating according with firm strategy.

To conclude, the results of WMT demonstrates SCA method is applicable in real business world and SCA outcomes meet realities but in order to validate and test formula for strategic decision making process, more studies and investigation are necessary and this model is still in initial stages.

This study also was the first research on evaluating the effect of K/T to SCA risk level considering resource allocation. Although this study does not conclude what is the influence, it builds a new path to further studies.

Appendix

The Calculation of CFI, BCFI and SCFI:

$$CFI = \frac{std(experience) * std(expectation)}{Gap\ index * Direction\ of\ development\ index * Importance\ index}, \tag{1}$$

$$BCFI = \frac{std(experience) * std(expectation) * Performance\ index}{Importance\ index * Gap\ index * Direction\ of\ development\ index}, \tag{2}$$

$$SCFI = \frac{\sqrt{\frac{1}{n}\sum_{1}^{n}(experience(i)-1)^2} * \sqrt{\frac{1}{n}\sum_{1}^{n}(expectation(i)-10)^2} * Performance\ index}{Importance\ index * Gap\ index * Development\ index}, \tag{3}$$

The parameter are:

$$Gap\ index = \left| \frac{Avg\ (experience) - Avg\ (expectation)}{10} - 1 \right|, \tag{4}$$

$$Direction\ of\ development\ index = \left| \frac{better\% - worse\%}{100} - 1 \right|, \tag{5}$$

$$Importance\ index = \frac{Avg\ (expectation)}{10}, \tag{6}$$

$$Performance\ index = \frac{Avg\ (experience)}{10}, \tag{7}$$

$$SD\ expectation\ index = \frac{std\ (expectation)}{10} + 1, \tag{8}$$

$$SD\ experience\ index = \frac{std\ (experience)}{10} + 1, \tag{9}$$

Calculation of MSI factors:

$$Q' = \frac{Q}{Q + C + T}, \tag{10}$$

$$C' = \frac{C}{Q + C + T}, \tag{11}$$

$$T' = \frac{T}{Q + C + T}, \tag{12}$$

$$F' = \frac{F}{Q + C + T + F}. \tag{13}$$

The MSI model for prospector group:

$$MSI_P = 1 - [(1 - Q'^{1/3}) * (1 - 0.9 * T') * (1 - 0.9 * C') * F'^{1/3}]. \tag{14}$$

The MSI model for analyzer group:

$$MSI_A = 1 - (1 - F') * [abs[(0.095 * Q' - 0.285) * (0.95 * T' - 0.285) * (0.95 * C' - 0.285)]]^{1/3}. \tag{15}$$

The MSI model for defender group:

$$MSI_D = 1 - (1 - C'^{1/3}) * (1 - 0.9 * T') * (1 - 0.9 * Q') * F'^{1/3}. \tag{16}$$

Calculation of risk level: Models of MAPE, RMSE and MAD:

$$\text{MAPE (absolute percentage error)} = SCA = 1 - \sum_{\alpha,\beta,\gamma} \left| \frac{BS - BR}{BS} \right|, \tag{17}$$

$$\text{RMSE (root means squared error)} = SCA = 1 - \sqrt{\sum_{\alpha,\beta,\gamma} \left(\frac{BS - BR}{BS} \right)^2}, \tag{18}$$

$$\text{MAD (maximum deviation): } SCA = 1 - \max{}_{\alpha,\beta,\gamma} \left| \frac{BS - BR}{BS} \right|. \tag{19}$$

S&R questionnaire:

	Attributes	
	Knowledge & Technology Management	
1.1	Training and development of the company's personnel	←Flexibility
1.2	Innovativeness and performance of research and development	←Cost
1.3	Communication between different departments and hierarchy levels	←Time
1.4	Adaptation to knowledge and technology	←Flexibility
1.5	Knowledge and technology diffusion	←Cost
1.6	Design and planning of the processes and products	←Time
	Processes & Work flows	
2.1	Short and prompt lead-times in order-fulfillment process	←Flexibility
2.2	Reduction of unprofitable time in processes	←Cost
2.3	On-time deliveries to customer	←Quality
2.4	Control and optimization of all types of inventories	←Quality
2.5	Adaptiveness of changes in demands and in order backlog	←Flexibility
	Organizational systems	
3.1	Leadership and management systems of the company	←Cost
3.2	Quality control of products, processes and operations	←Quality
3.3	Well defined responsibilities and tasks for each operation	←Flexibility
3.4	Utilizing different types of organizing systems	←Flexibility
3.5	Code of conduct and security of data and information	←Cost
	Information systems	
4.1	Information systems support the business processes	←Time
4.2	Visibility of information in information systems	←Time
4.3	Availability of information in information systems	←Time
4.4	Quality & reliability of information in information systems	←Quality
4.5	Usability and functionality of information systems	←Quality

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