VALIDATING PERFORMANCE BASED CRITICAL ACTIONS IN A HIGH TECH START-UP

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ABSTRACT

Purpose: A proposed analytical model in this research analyses the corresponding angles of the strategic triangles (Prospector, Analyzer, and Defender). The model compares the angle differences between the strategy and resource triangles with opinions from different management groups of informants. It was found out that NSCFI model more scientific comparing to formal ones through validation. The objective of this study is to analyse a Finnish manufacturing case company's operational competitiveness. Operational strategy is a vital element that supports businesses corporate strategies. The strategic decision-making is essential in operational competitiveness to generate quality decisions that would affect the successfulness of strategy formulation in manufacturing and sales.

Methodology: *The research is based on two methods; Manufacturing Strategy Index (MSI) and Sense and Respond (S&R). MSI detects the preferable strategy type and derives the proportions of importance between quality, cost, time and flexibility. Whilst, S&R analyzes dynamic business strategies and deviates influence on each attribute on the same four performances as in MSI.*

Findings: *The instruments used for data collection are questionnaires custom made for the company. Calculations based on the MSI questionnaire resulted in medium high values for the Prospector strategy both for past- and future orientation. S&R calculations regarding the past orientation resulted in low values for all strategy types, except P-NSCFI for Analyzer.*

Originality: *The managerial implication of this research is that it is critical for enterprise managers to adjust the direction of operations strategy according to consistency between operation strategy and resource allocation. Concerning the future orientation, we find high values for Analyzer and medium low to high values for the Prospector and Defender groups. The results would indicate that the case company has turned from a former strategy that was not clearly defined towards a highly Analyzer characterized business strategy.*

Key words: Sustainable Competitive Advantage, Sense and Respond, Manufacturing Strategy Index, Operations strategy, Case study

INTRODUCTION

As the rapid development of global economics, manufacturing enterprises are trying to find out a survival path to be stable in the competitive market and get benefit as much as it can be. Many manufacturing companies took convey and analysis to help managers make decision. It is undoubtedly that quantitative analyzing will provide management more assistance with numerical data. The idea has been modified by changing both denominator and nominator with rational level values in previous SCFI formulas (Liu, et al., 2011). Takala draw out the idea of using triangles to comparing operations strategy and resource allocation. The NSCFI model was developed by Liu and the new model accurately the S&R theory and trend research into the study. This proposed model further improves the accuracy and stability of NSCFI modeling and evaluating business strategic decision-making process, based on feedback on case studies using NSCFI. Through analysis of this case study it can be find out that to some degree several Sense & Response models have similar results, however the NSCFI give managerial implication with high accuracy comparing to formal ones.

This paper analyses the corresponding angles of the strategic triangles (Prospector, Analyzer, and Defender) and compare the angle differences between the strategy and resource triangles with opinions from different management groups of informants. In addition, this study develops a new S&R model named new critical factor index (NSCFI) model which based on formal models refers to CFI, BCFI, SCFI. And it is critical for enterprise managers to evaluate whether the operations strategy supports their resource allocation then it is more efficient to make decisions. The proposed analytical model created in this research provides benchmarking to BCFI and SCFI base on testing the hypothesis with the NSCFI model.

According to Takala (2013), the case study from one Finnish manufacturing company provided validation of the NSCFI model is the best until now. However, it needs to be proved in a large number of case studies and this case company is just one of our study area. In this paper, our validation comes from different departments of one Finnish company which initially a smaller Finnish company offering logistic services and products for the metal industry but has recently been acquired (purchased) by a bigger Finnish manufacturing company. This company is the world's leading professional related manufacturer, a wide range of business, including manufacturing and processing industries, shipbuilding, ports and terminals. The analyzing result has been taken from company managers´ operations feedback.

The structure of this paper is as follows. Section 2 introduces the study objectives. Section 3 reviews the latest related studies. Section 4 describes the methodologies. Section 5 draws findings of this study. Section 6 discusses the managerial implications, research limitations and also recommendations for future research.

LITERATURE REVIEW

Johnson describes strategy as 'the direction and scope of an organization over the long-term, which achieves advantage in a changing environment through its configuration of resources with the aim of fulfilling stakeholder expectations' (Johnson at al. 2005). Mintzberg states that strategy is organization's future plan, a position in specific markets, a pattern of its performance and a tactic to left behind its competitors (Mintzberg, et al., 1998).

Companies construct their strategies in many ways. They can compete either on cost, quality of products or services, high levels of customer service or customizing their products and services to fit individual customer needs. The operations function therefore must respond to this by providing the capabilities needed to fulfill the market requirement. In some ways this is a 'translation' task because the techniques and language used by marketing managers to understand the requirements of markets are different to the language and techniques used by operations managers to manage their productive resources. Slack and Lewis (2002) defined operations strategy as the pattern of decision which shape the long term capabilities of any type of operations and their contribution to overall strategy, through the reconciliation of market requirements with operations resources. The main vision of each company is to have an operational strategy that will keep the company growing. One of the key features of such strategy is the one that gives a way towards a unique strategic position in the market. According to Skinner (1986), the new competitive environment forces manufacturing companies to have a quick response to market demands, deliver high quality products, and the industrial system have to be flexible to new materials and customer needs. Therefore, continuous innovations are needed if the company wants to continuously growing and remain profitable over time. A well formulated strategy would help companies to allocate their resources wisely according to their capabilities and shortcomings in a dynamic environment.

Miles & Snow topology (1978) is a dominant framework of the strategy types. They have developed a comprehensive framework which states that the strategy type can be detected depending on the fixed proportions between RAL Model elements (Quality, Cost,

Time/Delivery, and Flexibility). According to this framework, there are four different groups; prospectors, defenders, analyzers and reactors. Prospector strategy is the one that always looking forward for opportunity to lead the industry through innovation. Defender strategy tries to maintain their current customer by taking advantage in cost to create a stable market. Analyzer strategy is an intermediate between defender and prospector strategy which tries to balance between quality, cost and time. Reactor strategy has no sense of aims or vision. Under this strategy, the decisions are taken in order to respond to immediate problem.

METHODOLOGY

Two methodologies apply in this case study: Manufacturing Strategy Index (MSI) and Sense and Respond (S&R). MSI refers to the operations strategy whereas S&R refers to resource allocation of a company. Both methodologies have a two-sided orientation: Past and future. Attributes are to be assessed for the situation during the past 3-5 years as well as the expectations for the future 3-5 years or equivalent dimensions. In this case study, informants were asked to assess the situation before and during the economic crisis of 2008/2009. Data was gathered by sending questionnaires to two white-collar employees of the case company. The first questionnaire covered the MSI criteria while the second set of questions asked for the attributes in Sense and Respond.

1 Sense and Respond (S&R)

The term 'Sense and Respond' as a business concept first appeared in the 1992 *Management Review* article by Stephan H. Haeckel. Originally a label describing a desirable type of organizational behavior, it evolved over the next six years into a post-industrial managerial paradigm, incorporating a set of concepts, principles, prescriptions and tools for creating and managing an adaptive enterprise. (H. Haeckel 1999)

According to Ivan Golovko (Golovko, 2012), 'Sense and Respond' is a scalable managerial framework developing ability to adopt improvements. To further describe S&R, it's important to mention the current framework used by organizations, 'Make and Sell'. This lower level framework will not allow organizations to operate as competitive as possible nor will they compete in the fierce and constantly changing business environment. Mr. Golovko describes S&R as "converting threats into opportunities, drawbacks into strengths."

The Sense and Respond questionnaire is used to analyze dynamic business strategies. In the S&R questionnaire you deviate accordingly to the influence of an attribute on Quality, Cost, Time and Flexibility of the business performance process. The main criteria (Quality, Cost, Time and Flexibility) have their sub-criteria, which leads to better understanding of RAL Model. (Figure 1)

Figure 1: Basic elements of RAL model

The S&R was utilized by Ranta and Takala (2007) by introducing critical factor index (CFI) to develop the operative management system. After introducing CFI, the S&R model has develop with three stages, which are called CFI, BCFI and SCFI model. The three models have common parts and the different parts are the numerator. The S&R model is used to analyze CFI of case companies.

The S&R questionnaire had 32 attributes to value. Quality had 7 attributes, Cost had 10 attributes, Time had 7 attributes and Flexibility had attributes of 8.

Figure 2: S&R questionnaire

2 Manufacturing Strategy Index (MSI)

MSI is described as the method of detection of the preferable strategy type. The method implies the key elements of RAL model and derives the proportions of importance between Quality, Cost, Time and Flexibility.

The MSI questionnaire uses pairwise comparison of criteria on a scale reaching from 9 on the left hand side to 9 on the right hand side, with a neutral choice of 1 in the between the two

criteria. The full questionnaire consists of 6 top-level questions and 36 detailed questions. For this case study however the MSI survey was limited to the 6 top-level questions.

KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	LAATU (Q)
KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	TOIMITUS (D)
KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)
LAATU (Q)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	TOIMITUS (D)
LAATU (Q)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)
TOIMITUS (D)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)

Figure 3: MSI top-level questions

To evaluate the answered MSI questionnaires, a model was built using the Expert Choice software. With this model, the priority weights of the criteria were calculated depending on the answers given by the company informants. With the priority weights at hand it is then possible to detect a company's strategy type according to the typology by Miles & Snow (1978), which defines the Prospector, Analyzer, Defender and Reactor business strategy types. For example a high priority weight would be an indicator for a Prospector strategy.

RESULTS AND ANALYSIS

1 Sense and Respond

The Sense and Respond questionnaire included 32 attributes within Quality (Q), Cost (C), Time (T) and Flexibility (F). However, the attributes for operation strategies were not equal. Attributes were divided as follows: Q: ten, C: eight, T: eight and F: seven. Since the questionnaire was custom made in advance, no attributes were equally compiled. In other words, no attributes were left out of the calculations. Hence, this may affect the results.
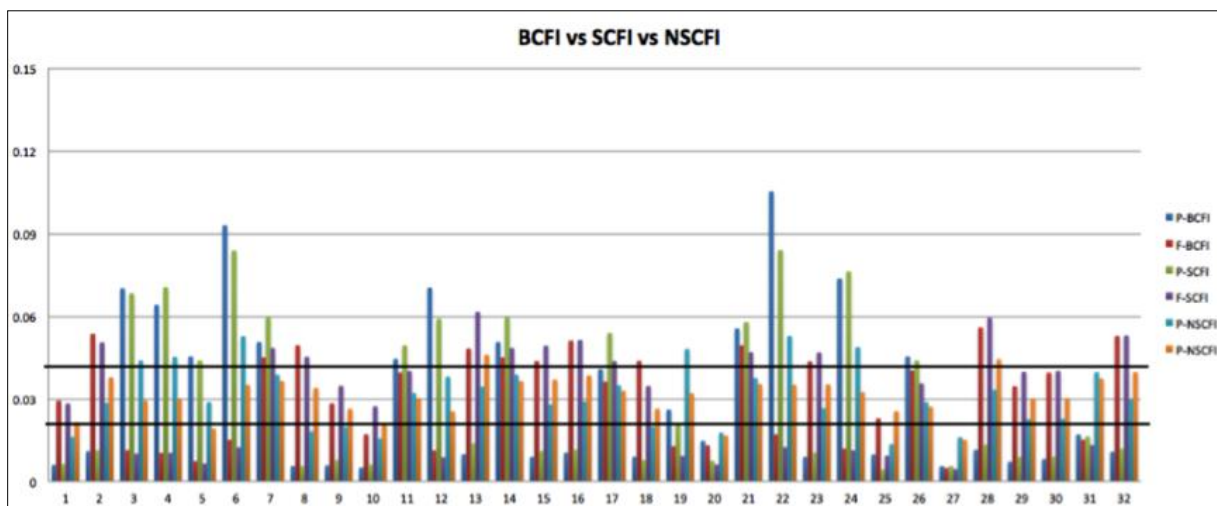

Figure 4: Results of BCFI, SCFI and NSCFI

Figure 4 shows the collected Sense and Respond data from the case company. This is an illustration of the trend for how critical factors change and develop directions. The Figure shows the calculated S&R results of past and future values using BCFI, SCFI and NSCFI models. The range of the attributes are divided into three parts; over resourced, balanced and under resourced. Therefore, if an attribute falls between the range of ⅓ and ⅔ of the average resource level, it is considered balanced. An attribute that is in the range lower than ⅓, is considered under resourced. In this case, average level is 100%/32=3,125%, which means that the judging values are 2,083% and 4,167%. This means, that any attribute lower than 2,083% is under resourced and any attribute higher than 4,167% is over resourced. The resource levels are marked with black lines in Figure 4.

A comparison of past and future BCFI, SCFI and NSCFI can be seen in Table 5. In Table 5, the attributes were analyzed one by one.

Table 5: Comparison of Past and Future BCFI, SCFI and NSCFI

Attribute	P-BCFI	F-BCFI	Trend	P-SCFI	F-SCFI	Trend	P-NSCFI	F-NSCFI	Trend
1	Under	Good	Better	Under	Good	Better	Under	Good	Better
2	Under	Over	Worse	Under	Over	Worse	Good	Good	-
3	Over	Under	Worse	Over	Under	Worse	Over	Good	Better
4	Over	Under	Worse	Over	Under	Worse	Over	Good	Better
5	Over	Under	Worse	Over	Under	Worse	Good	Under	Worse
6	Over	Under	Worse	Over	Under	Worse	Over	Good	Better
7	Over	Over	Better	Over	Over	Better	Good	Good	-
8	Under	Over	Better	Under	Over	Better	Under	Good	Better
9	Under	Good	Better	Under	Good	Better	Under	Good	Better
10	Under	Under	Better	Under	Good	Better	Under	Under	Better
11	Over	Good	Better	Over	Good	Better	Good	Good	-
12	Over	Under	Worse	Over	Under	Worse	Good	Good	-
13	Under	Over	Better	Under	Over	Better	Good	Over	Worse
14	Over	Over	Better	Over	Over	Better	Good	Good	-
15	Under	Over	Better	Under	Over	Better	Good	Good	-
16	Under	Over	Better	Under	Over	Better	Good	Good	-
17	Good	Good	-	Over	Over	Better	Good	Good	-
18	Under	Over	Better	Under	Good	Better	Under	Good	Better
19	Good	Under	Worse	Under	Under	Worse	Over	Good	Better
20	Under	Under	Worse	Under	Under	Worse	Under	Under	Worse
21	Over	Over	Better	Over	Over	Better	Good	Good	-
22	Over	Under	Worse	Over	Under	Worse	Over	Good	Better
23	Under	Over	Better	Under	Over	Better	Good	Good	-
24	Over	Under	Worse	Over	Under	Worse	Over	Good	Better
25	Under	Good	Better	Under	Under	Better	Under	Good	Better
26	Over	Good	Better	Over	Good	Better	Good	Good	-
27	Under	Under	Worse	Under	Under	Worse	Under	Under	Worse
28	Under	Over	Better	Under	Over	Better	Good	Over	Worse
29	Under	Good	Better	Under	Good	Better	Good	Good	-
30	Under	Good	Better	Under	Good	Better	Good	Good	-
31	Under	Under	Worse	Under	Under	Worse	Good	Good	-
32	Under	Over	Better	Under	Over	Better	Good	Good	-

Table 5 shows how the attributes change from before economic crisis to during economic crisis. There is comparison of results of past and future values using three different S&R models (CFI, BCFI and SCFI) which are based on analysis of 32 attributes one by one. The trend clearly shows how any specific attribute alters from past to future. When the value of an attribute in both before and during are good, the trend is considered to be unchanged and marked with "-". Values, which change from good to other, will show that the trend is worse. However, if values change from other to good, the trend is better. When values are either lower or higher, it is still recognizable to determine their direction. For instance, if two values are over resourced and the latter value is lower, then the direction is better and vice versa.

When comparing the results, a summary can be made that all values are valid. Looking at the trends for BCFI and SCFI, most of the attributes are marked as "Better" while NSCFI have almost the same amount of attributes marked with "Better" and "Same". The trend for before and during NSCFI is showing good results. Many attributes have shown 0 index values the reason behind this is zero standard deviation in the collected data, which is expected commonly. So from the 0 index value no real situation can be analyzed. But still the original CFI model is considered to be a benchmark to interpret the critical factors.

The BCFI and SCFI proved to be helpful for solving above mentioned problem and more interpretations can be made from the results. The addition of one to the standard deviation by the developer of BCFI, which results in standard deviation becoming one, avoiding the zero SD. For SCFI using root mean square to avoid zero standard deviation is enough. These formulas are shown in Figure 5 below.

Name	Model
CFI	$$CFI = \frac{Std\{experience\} \cdot Std\{expectation\}}{Imprtance\ index \cdot Gap\ index \cdot Development\ index}$$
BCFI	$$SD\ Expectation\ index = \frac{Std\{expectation\}}{10} + 1$$ $$SD\ Experience\ index = \frac{Std\{experience\}}{10} + 1$$ $$BCFI = \frac{SD\ Expectation\ index \cdot SD\ Experience\ index \cdot Performance\ index}{Imprtance\ index \cdot Gap\ index \cdot Development\ index}$$
SCFI	$$SCFI = \frac{\sqrt{\frac{1}{n} \cdot \sum_{1}^{n} [experience(i)-1]^2} \cdot \sqrt{\frac{1}{n} \cdot \sum_{1}^{n} [expectation(i)-10]^2} \cdot Performance\ index}{Imprtance\ index \cdot Gap\ index \cdot Development\ index}$$

Figure 5: CFI, BCFI and SCFI formula

The inconsistent results in CFI than BCFI and SCFI shows that critical factor index as the benchmark cannot be considered correct in real case study analysis. So, the derived formulas such as BCFI and SCFI are alternative options. This case study analysis also showed that the results of BCFI and SCFI are more consistent than the CFIs. From discussion with the case company inconsistent results can be verified which one is right and which one is wrong.

The feedback and discussion from the case company can verify if one is evaluating right. However, in this case the feedback from the case company is confidential.

2 Manufacturing Strategy Index (MSI)

Two informants from the case company answered the two questionnaires for MSI. When answering the questionnaire, the informants have marked the situations before the economic crisis of 2008/2009 with a green color. The situation during the crisis is marked with a red color. Informant number one did not provide answers concerning the situation before the crisis, due to the fact that his employment in the case company started after the crisis. Hence, informant number one had not been working there long enough to access the situation before crisis.

Table 6: MSI answered by Informant 1

KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	LAATU (Q)
KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	TOIMITUS (D)
KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)
LAATU (Q)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	TOIMITUS (D)
LAATU (Q)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)
TOIMITUS (D)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)

Table 7: MSI answered by Informant 2

KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	LAATU (Q)
KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	TOIMITUS (D)
KUSTANNUKSET (C)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)
LAATU (Q)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	TOIMITUS (D)
LAATU (Q)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)
TOIMITUS (D)	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	JOUSTAVUUS (F)

As the tables show, there can be seen which strategy types the case company has been focusing on before and during economic crisis. The strategy type derives the proportions of importance between Quality (Laatu), Cost (Kustannukset), Delivery (Toimitus), and Flexibility (Joustavuus). The answers of the informants are quite similar when comparing the answers during the economic crisis. Since only informant number two could state the importance of Q, C, D and F before economic crisis, there is no other answer that could be compared with it. Each result displays a high priority on Quality, followed by Delivery and Flexibility while putting little value on Cost. This order is consistent in between both Informants and in case of Informant 2 it even remains the same for the assessment before and during the economic crisis.

The MSI results shows that the case company, both before and during economic crisis, focused on the importance of Quality as their main strategy type. When calculating the integrated values, a weight of 1⁄3 was given to Informant 1 and 2⁄3 was given to Informant 2. It was decided to put more weight on Informant 2 due to the facts that he provided a full set of data and had more working experience in the case company compared to Informant 1. In the case of Informant 1, who was not able to assess the situation before the economic crisis, missing data was left blank and calculations for integration were adapted. Therefore, there is a 100% weight on Informant 2 for integrated P-MSI values.

Table 8: Integrated values of MSI

	Integrated values			
	Q	C	D	F
P-MSI	0,529	0,068	0,254	0,150
F-MSI	0,550	0,068	0,247	0,136

Table 8 shows the integrated values of the MSI results. Past Manufacturing Index for Q, C, D, and F, should have a value equal to one and Future Manufacturing Index for the same proportions should as well have a value equal to one. As can be seen in Table 9, both P-MSI and F-MSI have the same importance for the proportions, only some small changes in the values.

Table 9: Strategy type Prospector, Analyzer and Defender

	P	A	D
P-MSI	◯ 0,947	● 0,961	● 0,902
F-MSI	◯ 0,950	● 0,916	● 0,906

Considering the strategy type regarding to MSI-results, there can be seen that Analyzer is the strongest strategy type before economic crisis. However, the strategy type changes during the economic crisis from Analyzer to Prospector.

3 SCA

The integrated MSI- and S&R-results were put into the SCA-calculation. The sum check was true for each variable. SCA values shall be between 0 and 1. Values close to or greater than 0.97 can be considered as high. Values reaching from 0.93-0.97 are further referred to as "medium high" and values <0.93 as "low" values.

Table 10: Sum check and P, A, D results for SCA

	Q	C	T	F	Check	P		A		D	
P-MSI	0,484	0,071	0,283	0,162	TRUE	◯	0,941	●	0,896	●	0,898
F-MSI	0,550	0,068	0,247	0,136	TRUE	◯	0,950	●	0,916	●	0,906
P-BCFI	0,275	0,275	0,055	0,394	TRUE	●	0,908	●	0,902	●	0,908
F-BCFI	0,298	0,298	0,326	0,078	TRUE	◯	0,935	●	0,973	◯	0,935
P-SCFI	0,314	0,297	0,067	0,322	TRUE	●	0,914	●	0,893	●	0,912
F-SCFI	0,303	0,286	0,354	0,056	TRUE	◯	0,942	●	0,984	◯	0,941
P-NSCFI	0,264	0,250	0,217	0,268	TRUE	●	0,906	●	0,986	●	0,904
F-NSCFI	0,261	0,247	0,304	0,188	TRUE	●	0,913	●	0,985	●	0,912

SCA calculations derived from the MSI questionnaire (indicated with green background color) resulted in medium high values for the Prospector strategy and low values for the other groups, both for past- and future-orientation. The tendency in the MSI-based SCA values towards the Prospector group is supported by the MSI priority weights, which have a high emphasis on

quality. High priority weights on quality are typical for a Prospector strategy with quality being a crucial point for this type of strategy (Golovko 2012: 14).

Calculations based on the S&R questionnaire regarding the past orientation resulted in low values for all strategy types, except P-NSCFI for Analyzer. Concerning the future orientation, we find high values for Analyzer and medium high to low values for the Analyzer and Defender groups. These results would indicate that our case company has turned from a former strategy that was not clearly defined towards a highly Analyzer characterized business strategy.

Table 11: Angle results and MAPE, RMSE and MAD values

α	β	γ	α Degree	β Degree	γ Degree	Check	MAPE	RMSE	MAD
1,037	1,025	1,079	59,444	58,714	61,842	TRUE			
1,023	1,055	1,064	58,615	60,430	60,955	TRUE			
1,045	1,051	1,045	59,881	60,240	59,879	TRUE	0,935	0,958	0,968
1,059	1,024	1,059	60,657	58,687	60,656	TRUE	0,931	0,955	0,965
1,040	1,060	1,042	59,577	60,737	59,686	TRUE	0,928	0,951	0,965
1,060	1,021	1,061	60,712	58,521	60,767	TRUE	0,930	0,952	0,964
1,071	0,998	1,073	61,369	57,165	61,466	TRUE	0,935	0,958	0,968
1,069	1,003	1,070	61,226	57,465	61,309	TRUE	0,901	0,933	0,951

These angles more correctly reflect the way of business strategy implementation. The sum check was true for all angles. Calculations may have the outcome that the company has to change its operations strategy. Using SCA-method can bring stability, flexibility, and sustainability for the organization and enlarges its performance and competitiveness. With the result from this research the case company can forecast their future strategy and business performance.

4 Business environment and study expectations

In this research BCFI method was used to find critical attributes for a new start up business of a global company. The purpose was to identify the development actions needed and to prioritize resources for these measures. The second goal for the study was to recognize attributes with unclear goal setting and to emphasize the need for these to be clarified by the management.

The organization in focus is under change from R&D project to business process. The goal of the study was to collect expectations of different organizational groups and to highlight attributes that are considered as critical for the business development. These findings are taken into account when making decisions for strategic actions to follow.

In the core of the business is a material handling service which is executed by delivering a special tailor-made automated storage device for the customer company. Device is at the customer's disposal against fixed monthly fee that includes the storage system, support for the service and software development. The research covered supply department that manages platform, procurement, production and delivery activities.

FINDINGS

The questionnaire included 32 questions covering all supply activities and management attributes. Moreover some of the questions aimed to show up expectations about how the supply organization should support research and development. In this case the supply team cannot focus only on process development, but has a role to support R&D activities as well.

Nine questionnaires were sent and eight of them were responded. The data was handled in three groups, based on the organizational position of the respondent. Three answers were received from the board members, two from supply management and three from team leaders of other activities inside the business. When estimating the final actions results from all the three groups were taken into account.

Table 12: Attributes in questionnaire

Question Category	Atrribute number	Attribute
Production and material flow	1	Assembling functions are effective with minimized waste in the process
	2	Quality of assembling is homogenous and modules are compatible
	3	Asset risk of the material flow is being controlled and reported regularly
	4	The supply chain is quickly able to react on changes in market demand
	5	The needs of R&D are well considered within the production process
	6	Current receivables are on an optimized level when compared to deliveries
	7	Risks concerning stock and assets within material flow are under good control
Product platform	8	There is always available reliable cost information about the product
	9	New features developed by the R&D are utilised rapidly
	10	The product cost structure and it´s development are transparent
	11	Including new features to the manufactured product is cost-effective
	12	Production version and R&D version are clearly separated when sustaining delivery ability
Delivery and mounting process	13	Ability to deliver the system for test run within one working day is the target
	14	System deliveries are carried out precisely on the day confirmed for the customer
	15	Delivery process is budgeted and the budget is controlled in order to ensure cost efficiency
	16	The company brand is visible during each delivery process
	17	Mounting a system is managed in accordance with the company brand
	18	Delivery ability of the product covers also export markets
Support for product development	19	Supply actively joins developing the product
	20	Assembly applies the system in production
	21	Company's own production is used as a reference and a tool for sales activity
	22	Supply takes part in developing process control tools for the product
	23	Information security is taken into account within the scope of all operations
Supply management	24	Safety at work is strongly emphasized and kept in mind at all levels of production
	25	Communication between R&D and production works well
	26	Information about future deliveries is actively spread in order to maintain operational readiness
	27	Activities are well organized with clear definitions about employee responsibilities and authorities.
	28	The organisation values process discipline, only serious causes justify violating the process structure
	29	The information produced is reliable
	30	Professional skills of the employees are maintained and improved actively in accordance to job descriptions
	31	The company's ERP guarantees good support for the process
	32	Customer needs and wishes are thoroughly taken into consideration throughout the delivery

1 Critical attributes

The main findings of the research is related to cost and asset control. When starting a new business, the big challenge is how to make the right structural decisions to enable the expected growth. Three top critical attributes concerned risk management in stock and asset control. BCFI indicated these issues critical in both board and supply management results. In the results of the

team leaders' group the status was more unclear, but in overall results these attributes were considered critical.

In the results it can be seen that the board pictures the startup already in a bigger size. Expectations to grow are on a high level. With the current low volumes asset risks are not significant and there is a risk that the operating strategy does not focus on the process structure as closely as required. In this case growth is most likely to happen and the scale can be altered in a very short time. Quick change with low functionality of process operations might block the growth. Practically this sets a need to build consumption based material flow and process with good tools for parameter control to direct activities effectively.

2 Unclear attributes

Most significant finding within unclear attributes was that the organization did not have a unified vision about the schedule of making the business ready for export markets. This issue rose up in the discussion when the results were presented to board. This can be seen directly from the BCFI index values as well.

Other issues within unclear findings where related to product lifecycle and process parameter management activities. This means that the organization needs to clarify its' methods and processes concerning goal communication and production version management. When ramping up a business it is important to keep the product and the process updated matching the goal while simultaneously ready to support the changes needed.

Table 13: BCFI results

Attribute Number	BCFI Index			BCFI Ranking inside the group			Attribute Critical Level		
	Top management	Supply Management	Team leaders	Top management	Supply Management	Team leaders	Top management	Supply Management	Team leaders
1	1,175	1,110	1,509	4	5	27	Rather critical	Rather critical	Unclear
2	1,823	1,508	1,498	29	30	25	Unclear	Very unclear	Rather unclear
3	1,150	0,985	1,234	3	2	6	Critical	Critical	Rather critical
4	1,782	1,220	1,350	26	16	17	Rather unclear	Neutral	Neutral
5	1,195	1,343	1,585	5	24	30	Rather critical	Rather unclear	Very unclear
6	1,121	1,178	1,240	2	10	7	Critical	Quite OK	More critical than unclear
7	1,102	1,141	1,266	1	9	9	Critical	More critical than unclear	Unclear
8	1,821	1,332	1,183	28	23	4	Unclear	More unclear than clear	Rather critical
9	1,798	1,072	1,293	27	3	11	Unclear	Critical	Quite OK
10	1,469	1,074	1,306	19	4	13	Neutral	Rather critical	Neutral
11	1,316	1,195	1,481	11	14	24	Quite OK	Neutral	Rather unclear
12	2,102	1,327	1,311	32	22	14	Very unclear	More unclear than clear	Neutral
13	1,280	1,528	1,895	8	31	32	More critical than unclear	Very unclear	Very unclear
14	1,852	1,179	1,796	30	11	31	Very unclear	Quite OK	Very unclear
15	1,319	0,976	1,173	12	1	3	Quite OK	Critical	Critical
16	1,458	1,110	1,464	16	7	22	Neutral	More critical than unclear	More unclear than clear
17	1,672	1,429	1,128	24	28	2	Rather unclear	Unclear	Critical
18	**1,652**	**1,185**	0,781	22	**12**	1	More unclear than clear	Quite OK	Critical
19	1,252	1,236	1,260	7	18	8	More critical than unclear	Neutral	More critical than unclear
20	1,407	1,110	1,320	15	6	16	Neutral	Rather critical	Neutral
21	1,715	1,402	1,439	25	27	21	Rather unclear	Unclear	More unclear than clear
22	1,198	1,399	1,551	6	26	29	Rather critical	Rather unclear	Unclear
23	1,550	1,192	1,371	21	13	18	More unclear than clear	Neutral	Neutral
24	1,397	1,437	1,214	13	29	5	Neutral	Unclear	Rather critical
25	1,481	1,231	1,536	20	17	28	Neutral	Neutral	Unclear
26	1,910	1,272	1,297	31	20	12	Very unclear	Neutral	Quite OK
27	1,467	1,211	1,409	18	15	19	Neutral	Neutral	Neutral
28	1,299	1,284	1,465	10	21	23	Quite OK	More unclear than clear	More unclear than clear
29	1,652	1,389	1,414	23	25	20	More unclear than clear	Rather unclear	Neutral
30	1,405	1,240	1,266	14	19	10	Neutral	Neutral	Quite OK
31	1,463	1,124	1,315	17	8	15	Neutral	More critical than unclear	Neutral
32	1,292	1,631	1,501	9	32	26	More critical than unclear	Very unclear	Rather unclear

CONCLUSIONS

Results were used for strategic planning for the year 2013. The main focus now is to prepare processes for profitable growth to be ready for the expected period of growing fast. Actions are taken to improve process control tools and accuracy of asset management. The target is to create consumption based material flow with an agile parameter control.

Other important finding was the need of common understanding about the right timing when to start piloting export cases. Before starting to prepare going abroad maturity of operating processes and device have to be developed to a good level. If maturity is too low, the risk of loosing control of costs begins to grow too high. Basing on this study, the board has now generated a strategic plan and a realistic schedule about when to aim towards the export markets. This study has shown the value of BCFI method in investigating the status of an organization. With this method it is possible to produce numeric information about how well communication functions within organizational hierarchy or between teams. Also the level of understanding strategic communication and the way the different actions are linked to it in order to achieve the common goal can be measured.

Table 14: Action categories for attributes

Atrribute number	Attribute	Actions needes
1	Assembling functions are effective with minimized waste in the process	Make a plan about actions needed
2	Quality of assembling is homogenous and modules are compatible	Define targets as soon as possible
3	Asset risk of the material flow is being controlled and reported regularly	Make a plan about actions needed
4	The supply chain is quickly able to react on changes in market demand	No actions needed
5	The needs of R&D are well considered within the production process	Describe actions needed
6	Current receivables are on an optimized level when compared to deliveries	Make a plan about actions needed
7	Risks concerning stock and assets within material flow are under good control	Make a plan about actions needed
8	There is always available reliable cost information about the product	Define targets as soon as possible
9	New features developed by the R&D are utilised rapidly	Describe actions needed
10	The product cost structure and it´s development are transparent	No actions needed
11	Including new features to the manufactured product is cost-effective	No actions needed
12	Production version and R&D version are clearly separated when sustaining delivery ability	Define targets as soon as possible
13	Ability to deliver the system for test run within one working day is the target	Describe actions needed
14	System deliveries are carried out precisely on the day confirmed for the customer	Define targets as soon as possible
15	Delivery process is budgeted and the budget is controlled in order to ensure cost efficiency	Make a plan about actions needed
16	The company brand is visible during each delivery process	No actions needed
17	Mounting a system is managed in accordance with the company brand	Describe actions needed
18	Delivery ability of the product covers also export markets	Describe actions needed
19	Supply actively joins developing the product	Describe actions needed
20	Assembly applies the system in production	No actions needed
21	Company's own production is used as a reference and a tool for sales activity	Define targets as soon as possible
22	Supply takes part in developing process control tools for the product	Describe actions needed
23	Information security is taken into account within the scope of all operations	No actions needed
24	Safety at work is strongly emphasized and kept in mind at all levels of production	No actions needed
25	Communication between R&D and production works well	No actions needed
26	Information about future deliveries is actively spread in order to maintain operational readiness	Define targets as soon as possible
27	Activities are well organized with clear definitions about employee responsibilities and authorities.	No actions needed
28	The organisation values process discipline, only serious causes justify violating the process structure	No actions needed
29	The information produced is reliable	No actions needed
30	Professional skills of the employees are maintained and improved actively in accordance to job descriptions	No actions needed
31	The company's ERP guarantees good support for the process	No actions needed
32	Customer needs and wishes are thoroughly taken into consideration throughout the delivery	Describe actions needed

DISCUSSION

This study examined a case company's behavior towards operational strategy before and during the economic crisis in 2008–2009. The study was analyzed by the corresponding angles of the strategic triangles. Along with the study, a new S&R model, named NSCFI, was developed based on previous models. To verify a case study of this character, it is essential to acquire proper feedback from the case company in order to ensure the results.

It is vital for managers to have knowledge of their company's operational strategy. By understanding operational strategy, companies will allow themselves to make correct decisions that will have a positive influence on the companies' long term capabilities (Slack and Lewis, 2002). The method presented in this paper will help organization leaders to gain control over the strategic focus. Research shows, that this study has given the best validation yet known for NSCFI model. Hence, it is significant to prove this model in a larger scale of case studies.

The results indicate that the case company went from having a somewhat diffuse approach on strategy to a clear and profitable approach. If companies do not have a common vision for strategy, it might mean that resources are misspent. Before the economic crisis, the company's strategy was scattered between Prospector, Defender and Analyzer types of strategy. However, the Analyzer strategy type had the strongest numerical values both before and during the economic crisis. On the other hand, towards the crisis the Analyzer strategy type emerged clearer than any other. In other words, the company changed its strategy focus into one unified orientation where a balance between quality, cost and time was achieved (Miles and Snow, 1978).

It is important to remember the fact that one of the informants was only able to give insight on the situation during the economic crisis. Furthermore, the Sense and Respond questionnaire consisted of an uneven amount of attributes for each proportion. A last limitation is the relatively high inconsistency ratio for one of the informants' answers in the MSI questionnaire. All these factors, along with a larger number of informants could have an impact on the result of this case study.

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