

Evolution of a structural approach to scan external environment

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Abstract: :

In the era of uncertainty that most businesses are facing today, the ability of business strategists to understand and predict the business environment systematically and structurally is getting very important. The popular SWOT analysis requires the managers to review internal status of the organization as well as to scan their external environment. It is vital that the external situation should be efficiently and effectively diagnosed before any strategy is determined. Favourable external situations are opportunities and unfavourable ones are threats. Apart from identifying them we need to structurally quantify their magnitudes so that they can be prioritized appropriately. An innovative approach deploying the use of FMEA and SMEA is suggested here.

Key words: SWOT; Strategy; FMEA; SMEA

摘要：

現今大多數企業處都於一個不明確的年代，企業的策略師能有系統地知道及預測外面營商環境至為重要。一般採用的『優劣機脅』分析要求管理者檢討企業內部情況亦同時掃描外部環境。在釐定戰略之前他們必須有效及迅速地診斷外面情況。對企業有利的外部因素是機會，對企業不利的因素是威脅。除了確定有關的機會或威脅，我們亦要有系統地把它們的影響程度加以量度從而把它們的優先次序排列。本文議議一個創新的方法應用了失效模型效果分析(FMEA) 和成功模型效果分析(SMEA)

鍵鍵詞：

『優劣機脅』分析；戰略；失效模型效果分析(FMEA) ；成功模型效果分析(SMEA)

Common strategic tools

Strategic development and implementation are important responsibilities for the top executives of any company. Strategy is about analyzing existing status and determining desired status and then devising the most appropriate ways to get there. In reality, strategy formulation can be a very complicated process (Koo et al., 2007). The success of any organization is dependent on how effective strategies are developed and implemented.

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There are many different approaches to strategic development, e.g. Boston Consulting Group (BCG) Matrix, McKinsey's GE Matrix, Porter five forces, McKinsey's 7S, SWOT, Quality Function Deployment (QFD), Balanced Scorecard, (Crowe and Cheng, 1996; Kaplan and Norton, 1996, 2001, 2004; Feurer and Chaharbaghi, 1997; Weihrich, 1982;). Some of these approaches can be integrated to form a more holistic model e.g. through merging Balanced Scorecard, SWOT, and QFD (BSQ) (Koo et al., 2007; Ip and Koo, 2004; 顧良智 et al., 2005). Among these strategic tools, SWOT appears to be very widely used. Over the years, SWOT approach has been continuously refined and improved. The approach suggested by this paper is yet another step to further refine the SWOT analysis.

Strengths Weaknesses Opportunities Threats (SWOT)

The origin of SWOT came from SOFT [Satisfactory (meaning good in the present), Opportunity (meaning good in the future), Fault (bad in the present), Threat (bad in the future)] which was derived from the research work on corporate planning conducted at the Stanford Research Institute from 1960–1970. The SOFT analysis was presented at a seminar at Zurich in 1964 and Fault was later changed to Weakness and SOFT was renamed as SWOT (Humphrey, 2005). Subsequently Weihrich (1982) went further to modify SWOT (or TOWS) into the format of a matrix, matching the internal factors (i.e., the strengths and weaknesses) of an organization with its external factors (i.e., opportunities and threats) to systematically generate long-term strategies and/or short-term tactics and/or one-off action plans that ought to be undertaken by the organization.

Critical Internal Factors

Internal factors refer to those factors that can be controlled or manipulated by the organization. These internal factors or Key Success Factors (KSFs) are usually determined by way of brainstorming among a team of colleagues or experts familiar with the organization and its business environment. This approach may be less systematic and structured. Alternatively, Philip Kotler's (2000) 'Checklist for Performing Strengths/Weaknesses Analysis' can be used to supplement the brainstorming exercise. The Kotler Checklist has a high degree of resemblance with the Balanced Scorecard and with slight adjustment it can be converted to take the four perspective formats of BSC. Collectively, the management team could then rate the perceived importance and performance of each of these internal items on a Likert scale from 1 (least important or worst performed) to 10 (most important or best performed). If a large difference occurred among some of these perceived importance or performance scores, the concerned persons should state their reasons so that a compromise could be reached. The candid dialogue helps

alleviate possible misunderstanding among them and fortify mutual support in subsequent strategy implementation. The next logical step is to eliminate those “perceived” unimportant internal factors. Those remaining are important internal factors (i.e. KSFs) that should be closely monitored and well managed. Poorly performed KSFs are obviously weaknesses and well performed KSFs are the strengths.

The measurements on perceived importance and performance generate a very useful by-product, viz. perceived performance gap. The perceived performance gaps are operationally defined as the differences between the perceived importance and perceived performance. The larger the perceived performance gaps are the more urgent it is to improve on those attributes.

Critical External Factors

In today’s business environment, it is important to monitor the changes that happen around us. It is common to use brainstorming to explore possible external factors that may have an impact on the organization. The STEP or PEST approach (STEP is an acronym that stands for Social; Technological; Economical; and Political factors) can be applied to help analyze the external environment systematically. PEST is same as STEP except for the ordering of the factors. Very often people tend to simply use those external factors derived from the brainstorming session without further prioritization. Kotler (2000) suggests the use of Opportunity and Threat matrices in conducting the SWOT analysis. This is a significant improvement over the traditional approach but still a crude way to differentiate the various external factors. A slight modification was suggested by Ip et al., (2004); Koo et al., (2007); 顧良智 等 (2005 & 2007) to subjectively measure the magnitudes of both positive and negative impacts (i.e. the attractiveness and seriousness) and the probability of occurrence of opportunities and threats respectively into a Likert scale from 1 to 10. The importance scores (operationally defined as the product of probability of occurrence and impact magnitude) of external factors can then be calculated and ranked. External factors with lower “Importance scores” can and should be eliminated from the SWOT analysis. These remaining “important” external factors are used together with the “important” internal strengths and weaknesses to ensure a more succinct and meaningful SWOT analysis.

Failure Mode and Effects Analysis and Success Mode and Effects Analysis

An further enhancement of the Opportunity / Threat matrices, and the perceived “importance scores” is by way of FMEA (Short form for Failure Mode and Effects Analysis)

for threats and its derived format SMEA (Short form Success Mode and Effects Analysis) for opportunities (顧良智 等, 2007). This new approach is more structured and can reveal more information.

FMEA is a systematic and analytical quality planning tool that was originally developed to identify and prevent potential problems in the manufacturing sector. The analysis comprises three stages (Layzell et al., 1998):

- (1) to identify potential and previously unknown failure modes and all corresponding failure mode causes and effects;
- (2) to rank causes of failure according to likelihood (probability of occurrence and of nondetection) and impact (severity of the effects of the resulting failure mode);
- (3) to provide for problem follow-up and identify corrective action to be taken.

In addition to application in the manufacturing sector, Crane and Crane (2006) suggest that FMEA can be applied to prevent medication errors. FMEA has a long history and it first started in 1950s in aircraft design and then it was used in the space programme in the 1960s and was then incorporated into military standards (文放懷, 2004; 唐曉芬, 2002). It incorporates the quantification of Severity (SEV); Occurrence (OCC) and Detectability (DET) all measured on a rating scale from 1 to 10. Severity refers to the extent of the effect of failure on the customers (ranging from a scale of 1 denoting “minor impact” to a maximum rating score of 10 denoting “catastrophic impact”). Occurrence addresses the issue of how likely the cause of the failure to occur with rating 1 representing “not likely” to 10 representing “failure always occur”. Detectability refers to the estimated probability of failure not being detected. A detectability rating of 1 means “it is nearly certain to detect before reaching the customer” and a rating of 10 means “it is nearly certain that the failure would not be detected”.

A risk priority number (RPN) can be calculated as (Pyzdek, 2003; 文放懷, 2004; 劉偉等, 2005; 唐曉芬, 2002; 本堡等, 2003):

$$\text{RPN} = \text{SEV} \times \text{OCC} \times \text{DET}$$

The RPN carries a range of values from a minimum of 1 to a maximum of 1,000.

FMEA is also a quality tool used in the automobile industry. It is described as a systematic group of activities intended to (DaimlerChrysler Corp., et al., 2001; Crane and Crane, 2006):

- (a) recognize and evaluate the potential failure of a product/process and the effects of that failure;
- (b) identify actions that could eliminate or reduce the chance of the potential failure

- occurring, and
(c) document the entire process.

Yeung (2007) describes FMEA as an engineering technique for collecting and considering potential failure modes, causes and corrective action to be taken. It is a disciplined procedure to identify ways a product or process can fail and is a plan to prevent failures. FMEA has a broad application scope and can be applied for different scenarios and objectives.

Being deployed as a strategic tool, FMEA can be adapted to scan for external threats and then to quantify the extent of their significance in a structured way. The simple product of “negative impact” and “probability of occurrence” may be inadequate to determine the “real” extent of threats. Threats like earthquake, tsunami, SAR, bird flu become serious mainly because of the difficulties in detecting them at an early stage. Hence the concept of Risk Priority Number (RPN) is relevant and useful in quantifying and prioritizing the various threats. An external threat becomes less serious if and when new-technology is introduced to detect it easily.

Using similar logic an equivalent term similar to RPN should be used to reflect the real extent of opportunity prevailing to the organization. When external opportunities (with the same degree of positive impact and probability of occurrence) appear, all organizations should have the same chance to grasp them. Why are some firms always more successful than the others? The explanation to this phenomenon is the “determination and capability” of the firm in realizing the opportunities better than its competitors. Similar to the “detectability index” used in RPN, a subjective measure termed “determination and capability index” with 1 representing a least degree and 10 denoting a perceived maximum “determination and capability” can be determined. In this context, an Opportunity Priority Number (OPN) can be operationally defined as the product of perceived Attractiveness (ATT), Occurrence (OCC) and Determination and Capability (D&C), i.e.:

$$OPN = ATT \times OCC \times D\&C$$

OPN has a value ranging from a minimum of 1 to a maximum of 1000.

We thus use FMEA to quantify the real extent of external threats and we can adopt the use of Success Mode Effects Analysis (SMEA) to more realistically measure the extent of external opportunities.

Evolution of a structured approach to scan external environment

The gradual evolution of different approaches to scan the external environment provides better insight to managers and strategists and enable them to respond to the changes in external environment more effectively. The evolutionary changes are summarized as bellows:

1. Simple brainstorming;
2. Simple brainstorming along Social, Technological, Economical, and Political (i.e. STEP or PEST) factors;
3. Simple brainstorming along Political, Economical, Social, Technological, Environmental, and Legal (i.e. PESTEL) factors;
4. Simple brainstorming plus Kotler's (2000) Opportunity and Threat matrices;
5. Simple brainstorming and then quantifying the magnitude of perceived impact (positive for attractiveness for opportunities and negative for seriousness for threats) and their perceived probability of occurrence;
6. Brainstorming along STEP/PESTEL plus FMEA/SMEA and then calculating RPN and OPN for threats and opportunities respectively.

Although the FMEA/SMEA approach requires more time to prepare, it has the following advantages over the previous methods of external environmental scanning:

- The RPN and OPN provide much more useful information relating to each external factor. These RPN and OPN enable each external factor to be more critically reviewed and prioritized.
- In the course of determining the RPN and OPN, any major difference among raters can be clarified and this help improve communication, understanding, and co-operation among them.
- The various scores enable more effective monitor and control subsequently.

One possible criticism on RPN and OPN is that those rating scores are subjective ratings. However the subjective scores rated by a team of persons familiar with the organization and its environment should be acceptable in practical sense. One may also argue that “determination and capability” is an internal element whereas Opportunity is an external factor. In this respect, detectability in RPN is also an internal element as it is still up to the organization concerned to detect the threat. One final criticism on this FMEA/SMEA approach is that it is conceptual at this moment. Therefore empirical data or evidence is needed to justify its applicability in a wider context. In conclusion, this innovative FMEA/SMEA approach to more rigorously examine the external environment will be

useful to business practitioners as well as academic strategists in the era of changes and uncertainties.

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