

Firm Competence Evaluation Framework using AHP

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ABSTRACT

According to the competence-based theory, firm competencies are derived from capabilities that are unique in marketplace and are closely knitted within various business functions across the company. This paper provides a structured framework for evaluating the competencies of a firm using the Analytical Hierarchy Process (AHP). One distinctive feature of this framework is that a multi-criterion approach using financial as well as non-financial measures is applied for competence evaluation. The framework is illustrated using a “real world” manufacturing company as an example. The framework may be viewed as a benchmarking tool to help companies in strategic decision-making with regards to protection, development or outsourcing in-house competencies or resources.

Keywords: AHP technique, competence, capability, performance measures

INTRODUCTION

Firm capabilities may be differentiated according to their strategic value to business performance (Chester, 1994; Day, 1994; Markids and Williamson, 1994). Performance has been defined as “the way the organisation carries out its objectives into effect” (Flapper *et al.*, 1996). Many authors believe that only those capabilities that play critical roles in the attainment of business objective should be considered fundamentally important to the firm. In this paper, such capabilities are termed as key capabilities. The author also agrees with the view that key capability is “a capability that plays critical role in realising the business objectives of a firm” (Hitt and Ireland, 1985; Aaker, 1989; Myer and Utterback, 1993). Determining these key capabilities has been suggested as the first step towards core competence identification (Turner and Crawford 1994; Collis, 1996; Russo and Fouts, 1997).

Key capabilities are often related to the business performance in form of financial and non-financial performance measures. Financial performance is used by firms as an approach to assess the fulfilment of their economic objectives (Venkatraman and Ramanujam, 1986). Some outcome-based measures, for example, return on capital employed (ROCE), profit, productivity, and sales growth, are frequently employed for the purpose of assessment (Ghalayini and Noble, 1996). However, many authors have pointed out that focusing exclusively on the financial measures have implications (Blenkinsop and Burns, 1992). The critics argue that we have come a long way away from demand-led markets. Therefore, superiority in some operational areas such as customer service or new product development is becoming more and more important in the long-term survival of a business.

DETERMINING KEY CAPABILITIES

We would suggest that key capabilities should be determined through value evaluation. This involves analysing the contribution of firm capabilities against the financial and non-financial performances. Figure 1 presents a two steps framework for determining key capabilities.

Step 1: Determining Measures and Mapping Capabilities

Business performance measures are determined by taking into account corporate objectives and strategies. For example, when a firm employs a specific business strategy (e.g., cost leadership), there is some recommended performance measures associated to it (e.g., market share). As mentioned earlier, both financial and non-financial measures are to be included in the analysis.

The capability mapping process starts by auditing various functions within the firm. For example, management of the company can be asked to identify and describe the working practices within each function. A facilitator then helps to pull together these key skills and capabilities in a structured list form.

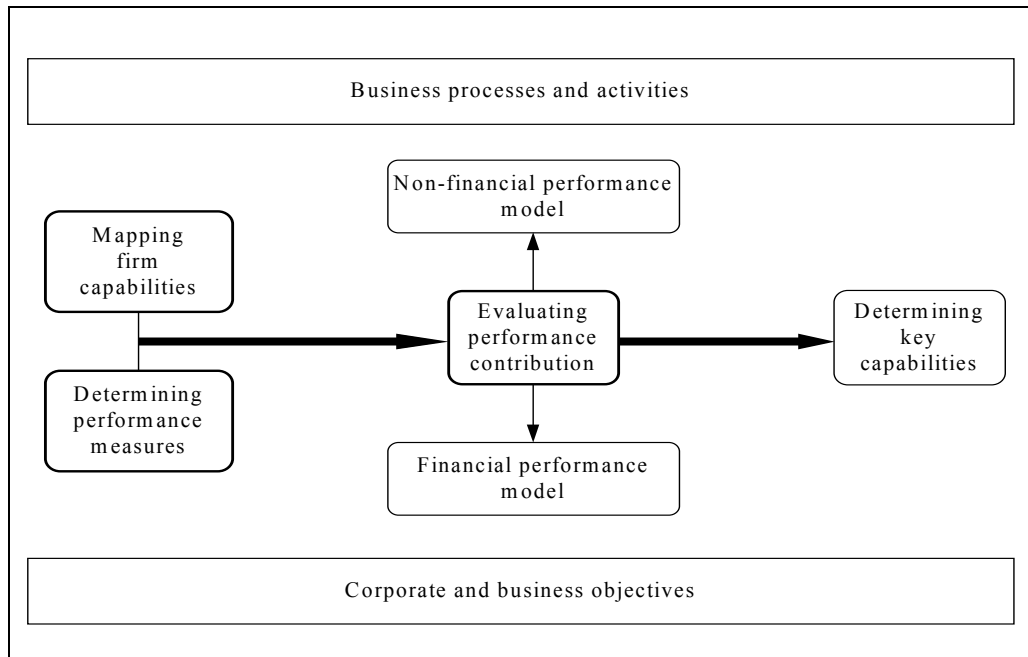


Figure 1 A Framework work for determining key capabilities

Step 2: Evaluating Performance Contribution Using AHP

The objective of this process is to identify those capabilities that are the major contributors to business performance. The involvement of multiple firm capabilities and the employment of financial and non-financial measures together indicate that the key capability determination is a complex, multi-criterion decision-making process. The AHP technique has been extensively applied in modeling the human judgment process (Lee *et al.*, 1995). It usually simplifies a multiple criterion problem by decomposing it into a multi-level hierarchical structure. This allows for quantitative and qualitative criteria to be considered and trade-offs among them to be addressed (Rangone, 1996).

The AHP application is established on three basic steps: the hierarchy construction, the prioritization procedure, and results calculations (Partovi *et al.*, 1990). The first step is to decompose the given evaluation problem into component parts and re-arrange them into a hierarchical order. A typical structure is very often made up by three levels. The top level reflects the overall objective of the evaluation. The second level represents the elements affecting the decision. These elements are called criteria. The third level comprises the decision alternatives. The criteria and the alternatives may have their own sub-criteria and sub-alternatives.

Once the hierarchy has been constructed, the decision-makers need to conduct pairwise comparisons to determine the relative importance of the elements in each level. Each element in turn is pairwise compared with respect to their importance to the elements up in the next higher level. AHP uses absolute values of 1 to 9 for pairwise comparison. A measure called the inconsistency ratio (IR) is used to check the consistency of judgment. Inconsistency likely to occur when decision-makers make careless errors or exaggerated judgment during the process of pairwise comparisons. Inconsistency ratio of 0.1 is considered as the acceptable upper limit. If the inconsistency ratio is greater than 0.1 then the decision-makers have to constantly re-evaluate their judgment in pairwise matrix until a IR of less than 0.1 is achieved.

CASE STUDY OF COMPANY A

The Company under investigation is a UK manufacturing company operating in a highly competitive steel product market. Its major customers include construction, food, aerospace, and defense industries. The business objective of Company A is defined to be “the number one choice of the customer within Europe”. The business

strategy of the company is to seek an effective way of providing high quality but low cost products to its customers.

A number of interviews were conducted with the management to elicit the necessary information. Keeping in mind the business objectives and strategy of the company, a total of six performance measures were selected. The financial measures included return on capital employed, sales growth and operating profits. The non-financial measures included market share, new product introduction and customer satisfaction. Subsequently, by translating the measures and capabilities in a four-level hierarchical structure, financial and non-financial AHP models were constructed (only the financial model is illustrated in Figure 2 for brevity). The first and the second level of each model were formed using respectively, the overall objective and the performance measures. The third and fourth levels were formed using respectively, the business functions and the identified twenty capabilities of Company A as mentioned earlier in Step 1.

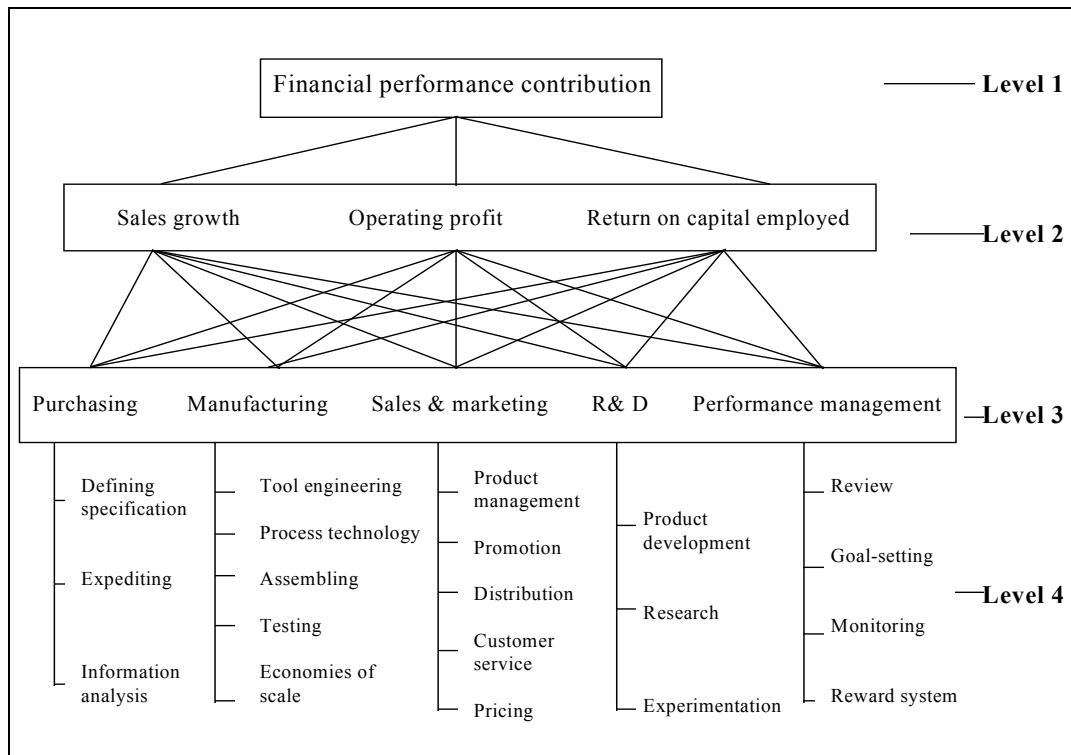


Figure 2. The financial AHP model of Company A

The evaluation process starts at the second level. The performance measures were compared pairwise to assign the subjective priorities. The specific question put up to the interviewee worded: “which performance measure is more important within the function and by what scale?” The scales assigned by the interviewee were then processed using an AHP software package. Using the inconsistency ratio (IR) as mentioned earlier, the subjective priorities assigned for the pairwise comparisons were examined. The priority weights thus obtained show that Company A was mainly interested in two performance measures: with respect to the financial category it was return on capital employed (ROCE) scoring a value of 0.655 as shown in Figure 3, and customer satisfaction (0.699) for the non-financial counterpart.

For level 3, the business functions are compared pairwise against each of the criteria employing the same procedure as described earlier. In order to collect data at level 4 of the hierarchy, the interviewee was asked to compare each of the capability alternatives in pairs. The specific question put up to the interviewee worded: “which capability is more important within the function and by what scale?” A summary of results of the pairwise comparison of the manufacturing function against its operational capabilities is illustrated in Figure 4 as an example. We can see that process technology and economies of scales are the clear winner in this category.

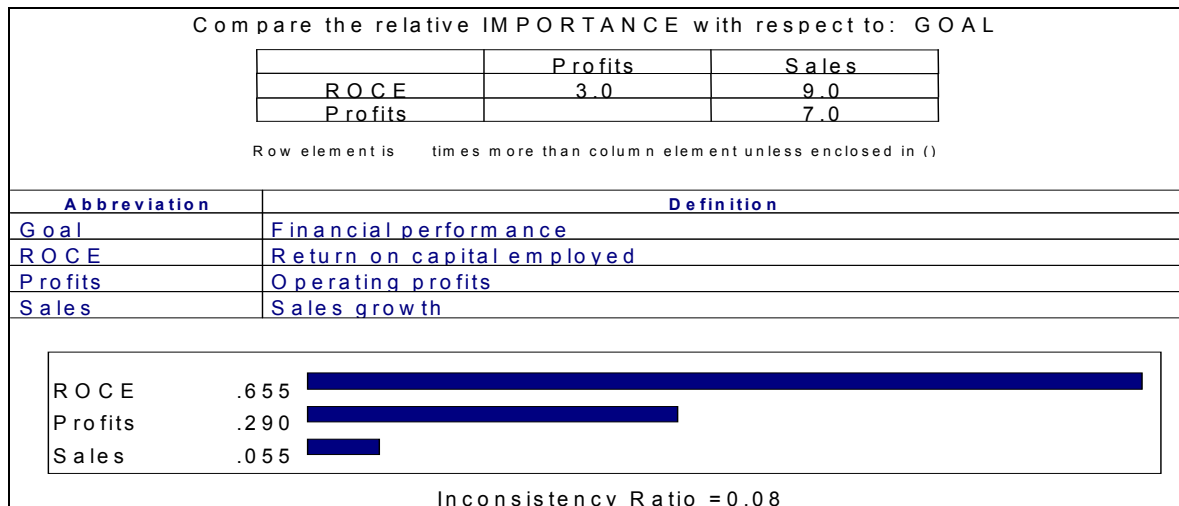


Figure 3 The priority weights for financial measures

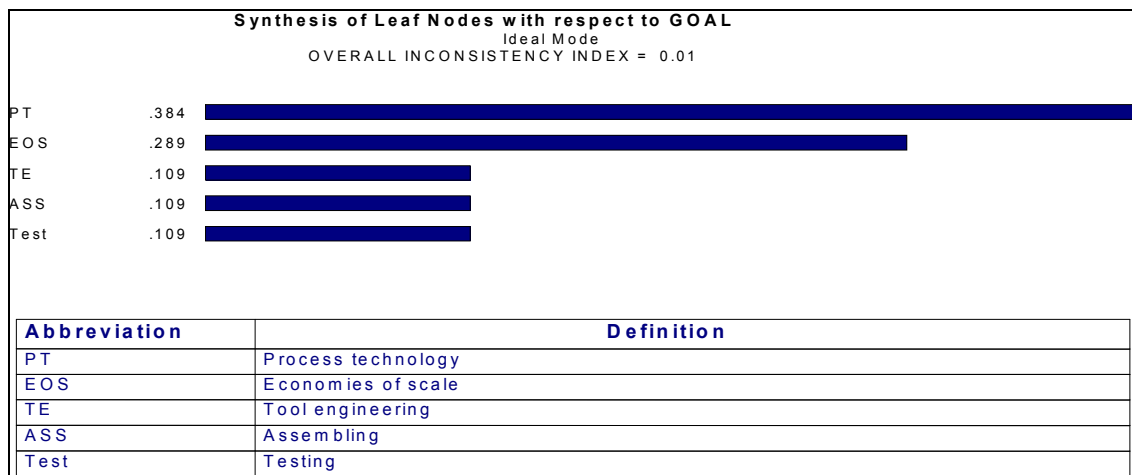


Figure 4 Pairwise comparisons of the operational capabilities of manufacturing function

KEY CAPABILITIES OF COMPANY A

The final priority weights of each of the capability alternatives to the objective (i.e., from level 4 up to level 1) were calculated through cross-multiplication. Table 1 presents a cross section of the overall priority weights for the financial and non-financial performance evaluations. Note that most of the individual capabilities have not secured high scores simultaneously against the both measures. For example, product development was rated high (0.137) with regards to the non-financial performance but low (0.058) against the financial performance. On the other hand defining specification scored high (0.089) with respect to the financial performance, but low (0.022) against the non-financial performance.

The key capabilities of Company A were determined by plotting the priority weights in a two-dimensional matrix form as shown in Figure 5. The capability alternatives mapped into the top right hand cell, namely, process technology and performance review, are clearly the key capabilities of Company A. Our experience suggests that most of the capability alternative usually score a high value against only one measure, for example, product development, research, economies of scale and pricing in Figure 5. Therefore, care is needed when scrutinizing those capabilities that are in the vicinity of the key capability zone. The identified key capabilities include not only process technology and performance review but also product development, economies of scale, pricing, and research. These results were verified with the Managing Director of Company A.

Operational Capabilities	Financial Performance weights	Non-financial Performance weights
Defining specification	0.089	0.022
Obtaining price quotation	0.030	0.007
Process technology	0.141	0.097
Economies of scale	0.110	0.073
Tool engineering	0.035	0.024
Product management	0.035	0.035
Customer service	0.035	0.035
Pricing	0.071	0.071
Promotion	0.018	0.017
Product development	0.058	0.137
Research	0.035	0.082
Design and engineering	0.012	0.027
Experiment	0.012	0.027
Performance review	0.124	0.163
Information processing	0.041	0.054

Table 1 The overall priority weights for the operational capability alternatives

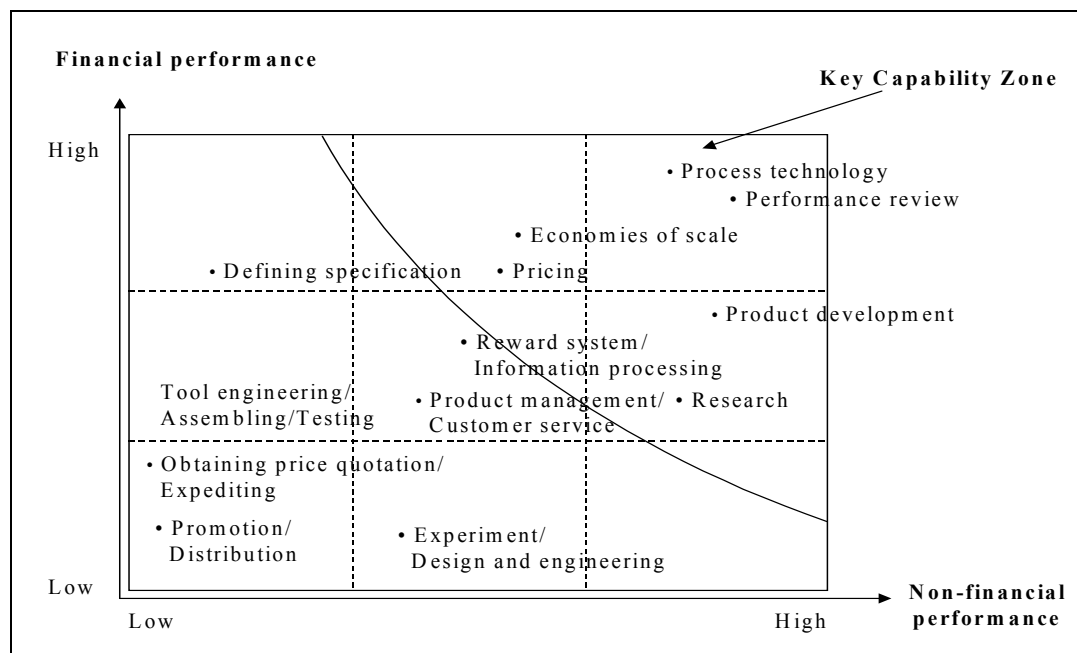


Figure 5: Key and non-key capabilities of company A.

CONCLUSIONS

This paper firstly provides the working definition of key capabilities and then discusses the criteria required for their evaluation. It is emphasized that both financial and non-financial performance measures should be used for evaluating the importance of capability alternatives to the business. Based on the AHP approach, a model of key capability evaluation is proposed. The present research is different to the model proposed by Moutinho (1993) as the evaluation process uses two exclusive AHP models for assessing the financial and non-financial performance of the capability alternatives. This allows the pairwise comparison between homogeneous measures, for example, profits and sales growth, rather than between heterogeneous measures, for example, profits and customer satisfaction.

In a further study the model was validated for five companies. These companies were from manufacturing as well as service sector. Similar procedure as described in this study was employed to identify the key capabilities using AHP analysis. The final results were verified with the management using the experiential evidences and

hindsight. These results were subject to a rigorous sensitivity analysis procedure for each capability alternative. The validation results show that it is appropriate to employ the AHP approach for assessing the capability alternatives based upon both qualitative and quantitative judgments. The sensitivity analyses performed for the identified key capabilities have shown that the AHP-based method is structured, robust and relatively simple to use. Further studies, using the results of 43 sample companies from a questionnaire survey, confirmed that our model is suitable for manufacturing as well as service companies. The results as given in Figure 5 can immensely help a company in the strategic management of its capability portfolio with regards to protection, investment and nurturing, or outsourcing a capability or competence.

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