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An analytic network process approach to operationalization of five forces model

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ABSTRACT

The five forces model has been one of the most influential frameworks for strategic management. In contrast to its importance as a centerpiece of textbooks, however, it has attracted less attention from both academic researchers and practicing managers. This is due to its innate weakness, difficulty in operationalization. The vital requisites for operationalizing the five forces model are to deal with it as a complex system composed of interrelated forces and their sub-forces, and to prioritize them with consideration of their interdependency. The tenet of this study is the requisites can be achieved through the analytic network process (ANP). The ANP, which is a generalization of the analytic hierarchy process (AHP), produces priorities of elements in a complex network model with consideration of interdependency among elements. The five forces model is transformed into a network model of the ANP. The ANP procedure is then carried out to obtain the priority weights of the forces. Combining the derived weights and ratings on the forces produces the state-of-industry-competition index (SICI) values that represent the overall competitive condition of a given industry. The working of the proposed approach is provided with the help of a case study example of the Web portal Industry of Korea. The proposed ANP approach is expected to expand the five forces model into a workable system of analysis by improving its analytical power.

1. Introduction

Porter [1]'s five forces model has been one of the most influential frameworks for strategic management [2]. It has been considered a standard tool for analyzing industry attractiveness, building upon the assumption that the state of competition in an industry is determined by the five competitive forces. In contrast to its importance as a centerpiece of textbooks on business strategy and strategic management, however, the five forces model has attracted less attention from both academic researchers and practicing managers [3]. Although several attempts have been made to augment, refine, and reinterpret the model [2,4–6], it seems to have failed to spawn a considerable literature and retain wide currency in practice, compared with other frameworks such as balanced scorecard (BSC) and SWOT analysis.

This may be due to its innate weakness that has often been pointed out by many researchers. Among others, the intrinsic limitation of the five forces model is its difficulty in operationalization; that is, its analytical power is limited in that the

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overall competitive condition as well as the degree of each force cannot be quantified. The simple three-level scoring (unfavorable/neutral/favorable) on the five forces has been prevalent, but it has the following problems. Firstly, it is not easy to draw the bottom line of analysis. The degree of each force can be easily captured in the three-level scoring; then, how is the overall condition of a given industry obtained? Simple average does not make sense since the relative importance differs across the forces. The forces do need to be prioritized for aggregation. An important thing that should be considered is the fact that the forces are themselves highly interdependent with each other; thus, the interrelationships among the forces should be captured in their prioritization [3]. Secondly, the degree of a force is also determined by its sub-forces solely as the overall attractiveness of an industry is determined by the forces. To be more systematic and objective, sub-forces should be measured individually, and then aggregated with their relative importance to gauge the degree of a force, rather than simple overall ratings on the forces. In sum, the vital requisites for operationalizing the five forces model are to deal with it as a complex system composed of interrelated forces and their sub-forces, and to prioritize them with consideration of their interdependencies.

The tenet of this study is the requisites can be achieved through the analytic network process (ANP). The ANP proposed by Saaty [7] is a generalization of the analytic hierarchy process (AHP), which is one of the most widely used multiple criteria decision making method (MCDM) [8]. It produces priorities or relative importance of elements in a complex network model with consideration of interdependency among elements. Although the ANP was originally developed for selection and prioritization of alternatives as a MCDM method, it has widely been employed and proved to be effective for quantification of existing frameworks by prioritizing elements that are interrelated with each other [9]. Recent years have seen an increase in applying the ANP to various strategic management frameworks since there is a growing need of employing sophisticated mathematical modeling for strategic management [10]. The examples include the strategic service vision framework [11], the balanced scorecard (BSC) system [12–14], the strategic management concept (SMC) framework [15], and strengths, weaknesses, opportunities and threats (SWOT) analysis [16]. This study also proposes an ANP approach to operationalization of the five forces model.

The remainder of this paper is organized as follows. Section 2 briefly outlines the preliminaries of this study, the five forces model and the ANP. The proposed approach is explained in Section 3 and illustrated with a case study in Section 4. The paper ends with conclusions in Section 5.

2. Background

2.1. Five forces model

The essence of strategy formulation is to cope with competition [1]; thus, strategic management begins by industry competitive analysis. Porter [17] argues that the degree of competition in an industry which determines industry attractiveness hinges on the five competitive forces: threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitute products or services, and rivalry among existing competitors (see Fig. 1). Understanding how the forces work in an industry and how they affect a company is a primary task facing strategic managers to formulate appropriate strategic responses. A brief explanation of the five forces is given hereafter [1,17,18].

(1) *Threat of new entrants*. The threat of new entrants is a function of the height of entry barriers. The higher the entry barriers are, the weaker is this competitive force. The sources of the entry barriers include economies of scale, brand loyalty, cost advantages, customer switching costs, initial capital requirement, government regulation, etc.
(2) *Bargaining power of suppliers*. The bargaining power of suppliers refers to the ability of suppliers to raise prices or reduce quality of inputs. Thus, powerful suppliers are a threat. Suppliers are powerful if: suppliers are concentrated; supplier switching cost is high; products or services are unique; the industry is not important to suppliers; threat of forward integration is high.
(3) *Bargaining power of buyers*. Buyers can threaten the industry by bargaining down prices or raising the costs by demanding better quality. Powerful buyers are the mirror image of powerful suppliers.
(4) *Threat of substitutes*. Similar customer needs can be fulfilled by the products or services of different businesses or industries. The degree of the threat of substitute products and services is determined by the number and closeness of substitutes as well as existence of other technologies.
(5) *Rivalry among existing competitors*. Intense rivalry among established companies constitutes a strong threat of profitability. The intensity of rivalry is relevant to the presence of various factors such as industry competitive structure, industry demand and capacity to meet the demand, differentiation among companies, and the height of exit barriers.

2.2. ANP

The ANP is a generalization of the AHP [7]. The AHP, also developed by Saaty [19], is one of the most widely used MCDM methods. The AHP decomposes a problem into several levels making up a hierarchy in which each decision element is considered to be independent. The ANP extends the AHP to problems with dependence and feedback [20]. ANP provides a general framework to deal with decisions without making assumptions about the independence of higher-level elements from