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Bildsten, Louise

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PO Box 117
221 00 Lund
+46 46-222 00 00

IMPLICATIONS OF STRATEGY IN INDUSTRIALIZED HOUSE-BUILDING – A LONGITUDINAL CASE STUDY

Louise Bildsten*

*Lund University, Faculty of Engineering Science and Technology,
Department of Construction Sciences, Lund, Sweden.
e-mail: louise.bildsten@construction.lth.se
Web page: <http://www.bekon.lth.se>

Abstract. *A firm's competitive advantage depends on its resources and how to manage them with the right strategies. The purpose of this study is to describe and analyze the strategies of a prefabricated housing producer. The firm produces multi-storey buildings of timber and has won national prizes due to its entrepreneurial success. The study was carried out through informal interviews with the firm's owners, through observations and documentation from the firm's archives. The study revealed that resources and dynamic capabilities are necessary to form restructuring strategies with the environment acting as a catalyst in this process. Two principal restructuring strategies occurred in the firm: (1) to make prefabricated houses and (2) to move into the real-estate business. As a first mover in the market to develop a building system, the firm gained a competitive advantage. The resource of the factory and employees conferred competitive advantage in terms of economies-of-scale. To be a successful entrepreneur depends on building dynamic capabilities. The same managers, building system and employees over the years sustained knowledge transfer between projects. Incremental improvement could therefore occur through learning by experience, which is the very essence of dynamic capabilities. This also fosters innovation. The study also shows that restructuring strategies arise not only from opportunities but also from riding out a crisis.*

KEYWORDS: prefabrication, house-building, strategy, resource-based view, dynamic capabilities

INTRODUCTION

To succeed in business is a challenge for every firm. Each firm has its unique resources and a unique way of managing them (Eisenhardt & Martin, 2001; Penrose, 1959) and is something that applies to construction firms alike. For example, industrialized house-builders organize their resources differently to firms whose main production is carried out on a construction site (Koskela, 2003). The physical resource of a factory, its employees and the expertise within the firm creates a particular building system that forms the basis of a firm's strategy (Eisenhardt & Martin, 2001; Penrose, 1959). According to Teece (2007), resources are governed by 'dynamic capabilities', which is something that cannot be acquired, but takes time to develop and which is affected by cultures, values and organization. The history of a firm is therefore important for its future strategies. To adapt to an ever-changing environment, dynamic capabilities must also be continuously be updated into new strategies (Teece, 2007). The purpose of the longitudinal case study presented in this paper is to describe and analyze the strategies of an industrialized house-builder through the resource-based view of the firm.

2 RESOURCES, DYNAMIC CAPABILITIES, THE ENVIRONMENT AND RESTRUCTURING STRATEGIES

The management of resources in terms of dynamic capabilities can create restructuring

strategies for sustainable competitive advantage. The resource-based view of the firm explains a firm's success or competitive advantage of the internal organization from a set of resources that are unique to each firm and each moment in time (Eisenhardt & Martin, 2001; Penrose, 1959). The resource-based view has, more recently, been expanded by Teece (2007) with dynamic capabilities. Some firms are more successful in situations of rapid and unpredictable change. The environment is constantly changing comprising of, for example, economic recessions, technological obsolescence, infrastructure and operational inefficiencies (Pearce & Robbins, 2008). When the environment is shifting, the dynamic capabilities by which firms 'integrate, build and reconfigure internal and external competences' are the source of sustained competitive advantage (Eisenhardt & Martin, 2001). Restructuring the firm based on the changing environment is a reactive change in operations of a business to stabilize economic performance (Bowman & Singh, 1993). Dynamic capabilities alone cannot sustain competitive advantage: the resources must exist to be reconfigured into new strategies (Eisenhardt & Martin, 2001). Resources, dynamic capabilities and reconfiguration strategies will now be further explored.

Resources can be physical (e.g. specialized equipment, geographic location, raw materials), human (e.g. expertise in construction), and organizational (e.g. a stable workforce). A firm's resources are argued to be scarce and endowed with different levels of efficiency (Peteraf, 1993). The goal is to capture the conditions under which the most efficient resources, i.e. superior resources, can be sustained. According to Barney (1991), competitive advantage can be sustained by the fulfillment of three criteria: imperfect imitability, imperfect substitutability and imperfect mobility. If firms that do not possess a resource cannot obtain it, it is imperfectly imitable. If resources are substituted but cannot sustain competitive advantage over the long-term, imperfect substitutability is implied. If resources are non-tradable or less valuable to others, it signifies the occurrence of imperfect immobility. A resource is also something that can be thought of as strength or a weakness in a firm (Andrews, 1971). Wernerfelt (1984) believes that the bargaining powers of a supplier can be dealt with through control of the critical inputs as part of a monopolistic group, e.g. by standing for a large share of a supplier's total sales. In this way, access to the supplier's resources will diminish for competitors. Correspondingly, if resources can be sold in monopsonistic markets only, the bargaining power of buyers is strong. Substitute resources can depress returns for a given resource. The holder of a resource can in some cases 'maintain a relative position vis-à-vis other holders and third persons, as long as these act rationally' (Wernerfelt, 1984, p.173). The fact, for example, that a firm already possesses a resource affects the costs and/or revenues of later acquirers negatively. The resource position barrier can thus be seen as a protection against new entrants to the market (Lockett & Thompson, 2001). Wernerfelt (1984) argues that it is possible to identify classes of resources for which resource barriers can be built up. The barriers are often self-produced, meaning that a firm at a given time, which is ahead of others, can use these barriers to consolidate a leading position. Wernerfelt (1984) gives four examples of resource barriers also referred to as 'attractive resources': (1) machine capacity, (2) customer loyalty, (3) production experience and (4) technological leads. Machine capacity is a resource position barrier in the sense of economies-of-scale. It would be irrational for entrants to buy the resource in order to compete as excess capacity can be costly. Customer loyalty generates a resource position barrier in terms of established customer relationships. For example, there are first mover advantages in government contracts and in accessing raw materials. Srivastava et al. (2001) propose that resources can also be seen as market-based assets in the form of relational resources which are a form of customer loyalty. Production experience is a resource position barrier for first movers as it takes time to build experience and lack of experience of production leads to larger costs. Technological leads constitute a resource position barrier as they lead to higher

returns. However, to remain market leader, technological capabilities must continue to grow. According to Srivastava et al. (2001), knowledge about the competitive environment is another resource, that of ‘market leads’, and which relates closely to dynamic capabilities.

Dynamic capabilities are managerial skills that continuously create, extend, upgrade, protect and manage the resources (Teece, 2007). These are also referred to as entrepreneurial cognition (Alvarez & Busenitz, 2001). According to Schumpeter (1934), the entrepreneur is at the heart of the firm to form new combinations of resources. Mere ownership of resources is not enough to stay competitive: the resources must be managed in an optimal way (Alvarez & Busenitz, 2001; Teece, 2007). Dynamic capabilities consist of: (1) the capacity to sense and shape opportunities and threats; (2) to seize opportunities; and (3) to maintain competitiveness through enhancing, combining, protecting and, when necessary, reconfiguring the business enterprise’s intangible and tangible resources. Lockett & Thompson (2001) state that if a firm is lacking dynamic capabilities it finds it difficult to be innovative and that has an impact on the firm’s ability to learn. Eisenhardt and Martin (2001) interpret dynamic capabilities as ‘routines to learn routines’ and are seen as a combination of different skills in, for example, product development and corporate decision-making. Castanias & Helfat (2001) also point out that different managers have different skills that are valuable in combination for the firm, which can be personality traits, functional experience and education. Dynamic capabilities take time to develop as they occur through a learning process (Teece, 2007). Unique stories, i.e. path-dependence, of each firm form distinctive routines (Lockett & Thompson, 2001; Teece et al., 1997). Also, repeated practice within a certain area develops expertise (Eisenhardt & Martin, 2001) that has been observed in terms of learning curves in manufacturing (Argote, 1999).

Restructuring strategies may, as mentioned, be necessary to maintain competitiveness (Teece, 2007). According to Eisenhardt & Martin (2001), restructuring strategies play a more important role than dynamic capabilities to maintain competitive advantage. According to Bowman & Singh (1993), there are three forms of corporate restructuring: portfolio, financial and organizational. Portfolio restructuring implies a change in the mix of business. Financial restructuring includes changes in a firm’s capital, ownership or governance. Organizational restructuring involves reconfiguration of departments, plant closing, downsizing or outsourcing. If the firm is too complex, it can be beneficial to downsize (Lockett & Thompson, 2001). The nature of the managerial skills determine how restructuring should be carried out (portfolio, financial or organizational) depending on the environment. In the formation of new strategies, the dynamic capabilities should constantly adapt to the firm’s environment (Teece, 2007). As Håkansson & Snehota (1989, p.187) state ‘no firm is an island’: a firm’s resources are affected by the surrounding environment.

Deduced from theory, resources provide input to dynamic capabilities to form restructuring strategies and all are affected by the environment (see Figure 1).

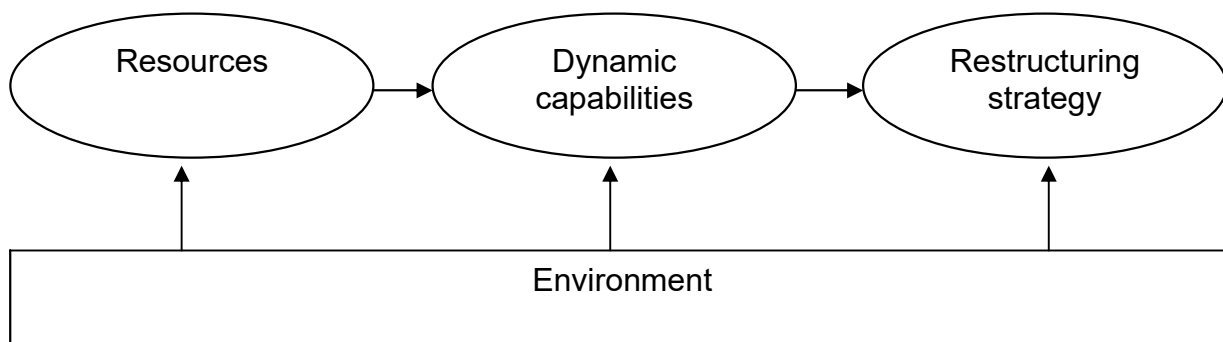


Figure 1 : Resources, dynamic capabilities and the environment form a restructuring strategy

3 METHODOLOGY

Since strategies are formed upon the historical happenings within a firm (Teece et al., 1997), a longitudinal study was chosen. Longitudinal studies are often used in sociology to study life events throughout lifetimes or generations, and in psychology to study developmental trends across the life span (Carlson et al., 2002). A case study is based on an in-depth investigation of a single individual group or event (Yin, 2008). The unit of analysis here is the leadership of an industrialized house-builder. There are three types of case studies: explorative, descriptive or explanatory (Yin, 2008). This is a descriptive case study that portrays the strategies of leadership over time.

The data were collected during a project running for three years. The researcher participated in the daily activities at the company for four months. Over this period, informal interviews and observations were made, involving personnel responsible for operations and management. Furthermore, two workshops were organized to discuss production improvements based on the collected data. During two of the three years, contact was kept on a weekly to monthly basis with the company through e-mails, telephone calls and meetings.

The collected data was documented as the research proceeded and the analysis of the data involved looking for patterns and describing these through a theoretical framework. A single case study may appear to be little to underpin new theoretical knowledge; however, Flyvbjerg (2001) argues that it can still be important for enhancing knowledge. A richer and more accurate description for advancing understanding can be obtained through in-depth learning of a particular context. In a longitudinal case study, the researcher is continuously pursuing the perfect explanation during an extended period and can, therefore, gain a deep understanding. For generalization however, a single case study has limitations but can serve as a starting point for further studies (Flyvbjerg, 2001; Yin, 2008).

4 LONGITUDINAL CASE STUDY: AN INDUSTRIALIZED HOUSE-BUILDER

The firm is a family-owned business with a long history of building houses over generations. The firm started in 1924 when the great-grandfather of the present owner took over a water-driven sawmill in a small village in northern Sweden. In the spring, when the water ran fast, timber was sawn at high speed and in the summer, houses were built. The midnight sun made construction possible even at night. The Great Depression of the 1930s also struck this small business and the firm had to shut down. A lot of people in the village migrated to America. After the Second World War, the youngest son started up the sawmill business again and his elder brother, studied to become a registered builder. The two brothers had a shed where tools were kept and together they built various buildings such as kiosks, shops, garages and special houses for wealthy and poor families. During the 1950s and 1960s, the firm attracted more and larger projects from the local municipality and neighboring municipalities. The firm even undertook an extensive refurbishment of two churches. In 1969, the firm acquired a housing factory and a new company was formed. House components were now produced in the factory and transported to the construction sites. In 1973, the economy in Sweden was healthy and a population growth was expected. The municipalities planned a lot of new housing, resulting in the so called 'miljonprogrammet'. The firm moved the 'tool shed' and the housing factory to a new location to concentrate everything in one place. A factory building of 2,400 m² was completed. It was a mix of old and new machinery and now panel elements could be produced in the factory and transported to the construction site. The old sawmill was reconstructed and was driven by electricity instead of water. The sawmill began to produce stairs, balconies and carports for projects. In the 1980s, the firm started experimenting with energy-efficient buildings in collaboration with university researchers; however, the climate

was much too cold for the system to work. Even so, the level of prefabrication increased and a joint-venture with another house-builder was created. Now, electrical installations were integrated into the walls to rationalize the work on site. The collaboration was a success and 70 houses were built. In the 1980s, the founders of the re-established business died, which left two young sons to manage the firm. The core competence of the management of the firm was however lost. The two brothers had different characters: one was fast-moving and rough and would now handle customers and the other was more philosophical and would now handle purchasing and production. Nevertheless, they managed the firm well and complemented each other. An accountant was employed as a manager to recover costs on projects and finalise contracts. In the 1980s, there was a downturn in customer demand and the firm had to be flexible and take any project at hand even economically-risky projects like moving buildings. The firm also diversified its activities by entering the real-estate business, building residential homes that it also maintained. In the 1990s, the firm developed its building system to enable most of the production to be undertaken in the factory. In this way, the house components could be transported and reach more distant markets. The development of the building system was undertaken jointly with the university's researchers. The building system consisted of volumetric timber elements, which were painted and equipped with carpets, plumbing and electrical installations. Closer relationships with suppliers were established to involve them more in the factory's production and included painters, electricians and plumbers. Roofs were also produced in the factory. All the components were then transported by truck to their final location. In 1994, the legislation that previously forbade multi-storey timber buildings was changed and taller buildings constructed of timber were allowed. The building system of volumetric elements fitted in well with this change as the volumetric elements could be piled into taller structures. The first project with piled volume elements consisted of 168 student apartments. This first project had cost overruns of 20%; however, the cause of the cost overrun was detected and it was possible to improve the process as well as control costs. In 1998, the building system was further developed through the use of IT to customize houses for clients. The new houses were exhibited at the local Winter City Festival. The firm has participated in several research groups to refine its building system and became successful in winning several national prizes. In 2006, the factory was expanded, and the total area is now 17,400 m² enabling the production of 1,500 apartments per year.

5 ANALYSIS

The model of analysis (Figure 1) includes resources, dynamic capabilities, restructuring strategies and the environment. To analyze those resources that can be 'manipulated' through the dynamic capabilities into strategies, the *resources* need first to be identified. The main physical resource of an industrialized house-builder is the factory that enables economies-of-scale. The possession of machine capacity to build fast at a low cost make it difficult for new entrants to compete. Another resource barrier of the industrialized house-builder is customer loyalty on the part of the municipalities. The municipalities were earlier its principal clients. This first mover advantage of contracts with the municipalities put them ahead of competitors. The municipalities can be seen as relational resources. The firm gained the resources of raw materials when acquiring the local sawmill (as first mover). A long-term supplier strategy was then implemented for both products and services to secure supply. The firm grew its human resources and technological lead by experimenting with new and more efficient building techniques, namely prefabrication. The factory also had organizational resources in the form of a stable workforce. The fact that the firm has regular painters, carpenters, plumbers and electricians means a ready supply of skills. Those that are not

employees are hired through their company and become relational resources.

The unique history of the case firm generated experience in the form of *dynamic capabilities*. Each project was a learning process and as the learning curve of manufacturers/producers gets better with each project so it did for this firm. Entrepreneurial spirit is a form of dynamic capability that senses opportunities and reacts to them. Incremental changes to improve after each project is a form of dynamic capability. For example, the first project had 20% cost overruns, but the firm learned and improved the next time. To stick to the same building system and improve it gave them production experience, a dynamic capability that takes time to form. The move into the real-estate business gave it experience that could be combined with its building expertise. This was because the real-estate business gave them knowledge of clients' needs and so could refine their building techniques accordingly.

Restructuring strategies occurred in times of crisis and opportunities. When the founders died, the firm was managed through financial and organizational restructuring. The downturn in customer demand in the 1980s was managed through portfolio restructuring as the firm moved into the real-estate business. It was also a form of portfolio restructuring when the firm developed its own building system of volumetric elements in the 1990s to reach more distant markets. The building system was developed just at the right time before the legislation changed to allow taller buildings. This can be regarded as the most significant scenario of first mover advantage for the firm. To hire expertise instead of doing everything themselves (outsourcing) was an example of organizational restructuring that is continuously growing in the firm. This shows that relational resources outside the firm must also be taken into consideration to reach an optimal solution. The analysis is summarized in Figure 2.

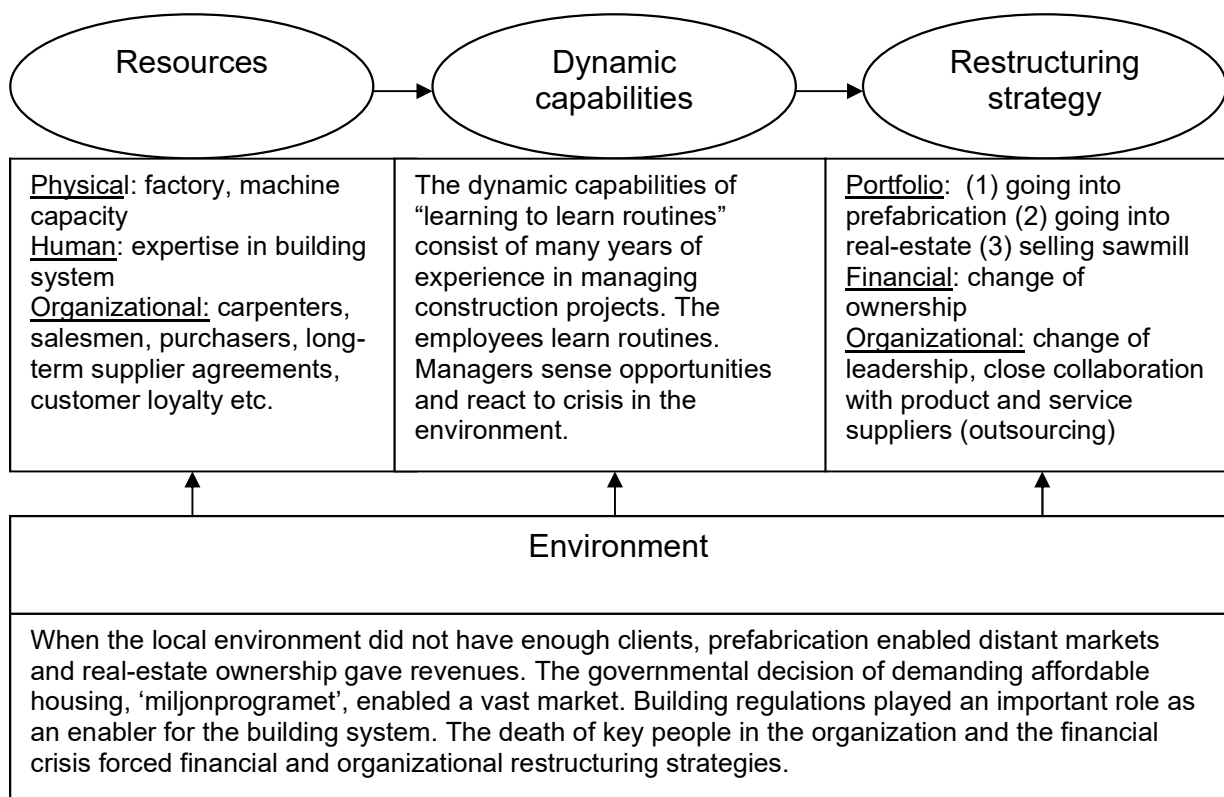


Figure 2 : Formation of restructuring strategies at the case firm

7 CONCLUSIONS

Resources and dynamic capabilities are necessary to form restructuring strategies and the environment acts as a catalyst in this process. The two principal restructuring strategies that occurred in the case firm was the decision to make prefabricated houses and the decision to move into the real-estate business. Being a first mover in developing the building system gave it a strong competitive advantage. The resource of the factory and employees created competitive advantage through economies-of-scale. Successful entrepreneurship depends also on the dynamic capability of managing resources the right way. The consistency of leadership with the same managers, building system and employees over the years enabled knowledge and sustained knowledge transfer between projects. Incremental improvement can therefore occur through learning by experience. This is the very essence of dynamic capabilities. It can be assumed that this also fosters innovation. The study also shows that restructuring strategies occur not only to handle opportunities but as a means to ride out a crisis.

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