“The Differences between Product and Process Innovation and Implications for Marketing Strategy”
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The Differences between Product and Process Innovation and Implications for Marketing Strategy

Organizations cannot remain still; in markets becoming increasingly globalized, effective performance depends on the successful management of innovation. However, the existing marketing literature has not sufficiently discussed the differences between various types of innovation (i.e., product vs. process innovation). Previous marketing researchers have focused more on product innovation than on process innovation, while more and more studies are emphasizing the importance of process innovation. This paper discusses the various definitions of these two types of innovation, as well as the differences between them. By making several suggestions regarding the differences, we suggest important research directions for strategic marketing contexts and offer important implications for organizations and managers.

Keywords: Product Innovation, Process Innovation, Marketing Strategy, Sustainable Competitive Advantage

Why is innovation important? The view that innovation is the central feature of competition in capitalist economies is widely held (Sciulli 1998). Due to the force of competition and changing consumer needs, the long-term survival and growth of a firm depends on its ability to develop new products and new methods (or processes) of organization (Zander and Kogut 1995). Particularly in today’s business environment, where every aspect of business – technology, government regulation, and global competition – is in a state of flux, there may be no executive task more vital than the sustained management of innovation and change. These rapid changes in the marketplace make it increasingly difficult for businesses to think long term and to constantly anticipate tomorrow’s definitions of value, which include the right mix of quality, service, product characteristics, and price (Sciulli 1998). To compete in this ever-changing environment, companies must create new products and processes. To dominate, they must adopt innovation as a way of corporate life.

Although the concept of innovation is very important in marketing research contexts, there are relatively few studies about innovation in marketing arenas. Few studies in marketing have examined innovation, and most of those that do are focused on product-related innovation. Marketing researchers have tried to explain how innovation can attract and influence the minds of customers, and how firms can achieve a competitive advantage from innovation. All this research, however, emphasizes innovation based on new product development and improvement. In addition, previous marketing studies do not fully discuss discrete types of innovation and the differences between types.

At the most basic level, there are two types of innovation: product innovation, or changes in the products a company makes; and process innovation, a wholesale change in the way products are made and provided. Product and process innovations are distinguished based on the different areas and activities that each of them affect within a firm (Gopalakrishnan and Damanpour 1997; Ettlie and Reza 1992). However, little research has examined the respective parameters of these innovation types, including under which conditions each type of innovation is more important. The present discussion facilitates a better understanding among researchers of the different characteristics of innovation and the implications for marketing.

Accordingly, this paper discusses the two types of innovation together with the differences between the two concepts. Through this discussion, several propositions are advanced, and implications are thereby discussed in terms of strategic marketing research issues for practitioners and researchers. To achieve these goals, several examples from the automobile industry are provided. The automobile industry has been selected because it is one of the largest and most important global industries. It is also highly sensitive to and related to both types of innovation.¹

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Literature Review and Research Propositions

Innovation
In a broad sense, innovation may be defined as know-how composed of product technology (the set of ideas embodied in the product) and process technology (the set of ideas involved in the manufacture of the product or the steps necessary to combine new materials to produce a finished product) (Abernathy and Utterback 1978). Also, innovation has been defined as an idea, product, service or technology perceived as new and in the early stage of acceptance or use by an organization (Kotler and Armstrong 2000). Either way, innovation comprises two basic types: 1) product innovation and 2) process innovation. Each type of innovation requires a different framework in order to succeed. Also, both types involve different factors and outcomes. In general, process innovation is cost-reduction driven, while product innovation is more likely to be oriented toward product differentiation. Accordingly, we expect each type of innovation to be affected in different ways by explanatory variables (Lunn 1986; Kraft 1990).

Product versus Process
A “product” is a good or service offered to customers or clients, while a “process” is the mode of production and delivery of the good or service, including managerial processes such as marketing processes and segmentation processes (Barras 1986). Thus, product innovation is defined as new products or services introduced to meet an external user or market need, and process innovation is defined as new elements introduced into an organization’s production or service operations (e.g., input materials, task specifications, work and information flow mechanisms, and equipment) to produce a product or to render a service (Ettlie and Reza 1992; Knight 1967; Utterback and Abernathy 1975).

The distinction between product and process types of innovation is important because adoption of each type requires different organizational skills. Product innovation requires that firms assimilate patterns of customer needs, design, and manufacture of the product. Process innovation requires firms to apply technology to improve the efficiency of product development and commercialization (Ettlie, Bridges and O’Keefe 1984). Different factors influence both the adoption of product and process innovations, as well as the extent to which these innovations impact the adopting organization (Tornatzky and Fleischer 1990).

Product innovation provides the more obvious means for generating revenues. Process innovation, on the other hand, provides the means for safeguarding and improving quality, and also for saving costs (Kotler and Armstrong 2000). For example, one automobile company has tried to introduce a new car model into the market every year. In terms of product innovation, the company invests a lot of money in developing new automobile models to attract and capture the rapidly changing needs of customers. Improved and radically changed products are regarded as particularly important for long-term business growth. On the other hand, this automobile company has also been trying to reduce the implementation time of new product development and production processes in order to reduce their new product development costs. The power of product innovation in helping companies retain and grow their competitive position is indisputable (Gopalakrishnan and Damanpour 1997). Products must be updated and completely renewed in order to retain a strong market presence.

It is not enough, however, to avidly engage in product innovation for its own sake (Gopalakrishnan and Bierly 1997). It is important to identify just which product features are in need of improvement or would benefit from radical change. For this purpose, analysts have differentiated between core product features that facilitate customer evaluation, purchase, and use of the core product. In terms of specific products, the amount of help or support provided by an organization depends on the particular needs of customers. An appropriate premium price is typically charged for support. Support provides a potentially profitable lever for gaining a competitive advantage over makers of similar products. Providing support services enables a supplier to sell the same core product to different customer groups as different offerings (Storey and Easingwood 1998). For example, the goal of automobile companies in their development of various vehicles with the same mobile frame is two-fold – namely, to satisfy the different needs of customers and to reduce time and costs for developing new cars. Hyundai invested a lot of money to develop the Sonata frame. With that frame, Hyundai has also assembled the Santa Fe and XG models, as well as various other types of automobile models.

In fostering the technological development of a firm, the existing knowledge and capabilities of various sources encourage product innovation. Technological capabilities for new product success in that a firm’s ability to acquire and apply various innovations is more important for product innovation. Technological capability encourages a firm’s use of exploration capability and expertise for product innovation in the firm critical (Gulber 2005; Lavie and Rosenkopf 2006; Zhou and Wu 2009).

To undertake product innovation, a firm must identify and evaluate alternative capabilities of various sources. After identifying potentially useful capabilities, such as know-how, a firm must adopt a given capability from a source and modify it to make it suitable to the unique needs of the firm. After that, the firm must use and transform the capability into specific product attributes, thus comprising product innovation (Calile 2004; Smith et al. 2005).

Simultaneously, a firm depends on resource flexibility, a concept that emphasizes the inherent flexibility of an organization to concentrate on exploiting competitive advantages in coordinating the use of firm resources.

Using Internet databases such as ABI, I was able to find more than 100 articles related to innovation, but less than 10% of them included marketing-related research. The majority of articles related to management and information technology. Also, this 10% of marketing research focuses on product-related innovations.
Process innovation embraces quality function deployment and business process reengineering (Cumming 1998). Process innovation is a type of innovation that is difficult to implement, but its purposes are widely understood to be advantageous for today’s organizations. An efficient supplier who keeps working on productivity gains can expect, over time, to develop products that offer the same performance at lower costs. Such cost reductions may or may not be passed on to customers in the form of lower prices, or they may be accumulated as Schumpeterian rents. All automobile companies are working furiously to reduce operating costs, and also to increase service quality through process innovation. For example, an automobile company may attempt to standardize parts for various models. This standardization process has been highly beneficial to companies that utilize the process. Indeed, these companies have achieved some cost leadership in the industry, while offering automobiles to customers through various promotional methods such as 0% interest, 10-year warranties, and cashback rebates.

Process innovation is important for both the core products and the support offers of companies, including support packages with post-sale services and financing. Both components of an offer require that quality standards are met and maintained. In the case of services, which by their very nature rely on personal interactions to achieve results, the management of process innovation is a particularly challenging activity (Johne and Storey 1998).

Most firms try a more integrated process for successful innovation in uniquely uncertain environments. Such integration ensures a positive impact on overall firm performance. Process-oriented innovation is fundamentally different from product-oriented innovation. In particular, process management activities focus on efficiency and clear guidelines for innovation. Moreover, radical process innovation, which is highly dependent on integration, is important for firms in many industries (Benner and Tushman 2002, Benner and Tushman 2003).

Process innovation offers many competitive advantages. In particular, process innovation helps secure the market position of a firm given the characteristics of its product supply (Becker and Egger 2013). Process innovations are characterized by the significance of tacit knowledge, which hinders cooperation across disciplines (O’Connor 2008). Based on this tacit knowledge, a firm can reduce costs, improve quality, shorten delivery times, reduce inventories, minimize plant and equipment investments, shift scale economies, and allow greater flexibility (Lauenstein and Skinner 1980; Skinner 1984). An investment in new process technology can also be a strategic initiative to defend a market niche by increasing entry barriers (Utterback 1979; Zannetos 1984). Because process innovation is an important weapon in safeguarding competitive advantage, its characteristics and capabilities are key elements in aligning it with strategy. Some basic definitions of the two types of innovation are summarized in TABLE 1. The following section discusses the differences between the two types of innovation more specifically, and illustrates how these differences provide the field of strategic marketing research with ideas for further study.

### Organizational learning and knowledge management

Increasingly, organizational learning is a strategic tool in achieving competitive advantages in the marketplace due to its interplay of marketing capabilities and outcomes (e.g., Baker and Sinkula 1999). Many organizations emphasize this form of learning in their efforts to gain sustainable competitive advantages. For successful organizational learning, it is very important for members of an organization to learn quickly and easily. Also very important is that the members of an organization are able to easily access the right information from organizational memory precisely when the information is needed.

All knowledge is initially created by individuals. Knowledge does not become organizational knowledge until it is distributed throughout an organization in such a way that it can be stored in the organizational memory and institutionalized (e.g., Simon 1991; Moorman and Miner 1998). Accordingly, it is very important to quickly learn and assimilate an innovation, to save it safely within an organization, and to easily access it among internal mem-

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<tr>
<th>Definitions</th>
<th>Product Innovation</th>
<th>Process Innovation</th>
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<td>New elements introduced into an organization's production, management or service operations</td>
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<th>Orientation</th>
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<td>A market focus</td>
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<th>How</th>
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<tr>
<td>Assimilate patterns of customer need, design, and manufacture the product</td>
<td>Apply technology to improve the efficiency of product development and commercialization</td>
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bers while protecting it from outsiders. That said, which type of innovation is easiest to learn, can be readily saved, and can be accessed, but not be copied by competitors? These concerns are related to several interesting issues of organizational learning and knowledge management, including concepts of speed of adoption, complexity of knowledge, and imitation by competitors.

Speed of adoption: Product innovations are generally clearer than process innovations because product innovations are the outcomes of themselves, whereas process innovations are related to the production and delivery of the outcome (Kessler and Chakrabarti 1996). Moreover, product innovations require firms to clearly incorporate customer needs into the design and manufacture of the product in such a way that the change will be clearly visible to customers (Ettlie et al. 1984). On the other hand, process innovations are typically the result of hands-on experience and close familiarity with original processes (Kessler and Chakrabarti 1996).

Process innovation, by nature of its inherent impact on the overall change from inputs to outputs, is more tightly integrated with other sub-processes throughout an organization, and accordingly, usually involves a larger aggregate of tools, machines, people, and social systems (Tornatzky and Fleischer 1990). Also, process innovation is usually associated with more major changes in organizational structures and administrative systems (Ettlie and Reza 1992). Product innovation, on the other hand, is more often implemented independently from the system of an organization. In many cases, product innovation is industry-specific, initially tends to stand alone, and is more likely to be reverse engineered based on a competitor’s design (Brown and Duguid 1991).

For example, in order to change their manufacturing processes, automobile companies should theoretically build very different manufacturing factories. If the automobile companies changed or developed new models in terms of production innovation, however, they would need to modify existing manufacturing systems. Also, in many cases of automobile product innovation, minor changes in production and research and development (R&D) may occur, whereas most process innovations require wholesale modification to the organization or to production and R&D processes in their entirety. Also, because more parties within an organization tend to be more involved with process innovation than product innovation, the speed of learning among members of the organization will also be different. Therefore, based on the discussion above, the following propositions are proposed:

P1a: Product innovation adoption will be faster than process innovation adoption.

P1b: Product innovation learning will be easier than process innovation learning.

Complexity and imitation by competitors: Process innovation tends to be more complex than product innovation because process innovation is more interrelated with other systems in an organization. As described, this interrelation causes a less clear understanding of how and why a process works due to the causal ambiguity of the systems (Lippman and Rumelt 1982). On the other hand, product innovations, because they are more apparent, are usually easier to understand. Also, process innovation is more complex in the sense that generating new ideas requires an understanding of how the sophisticated systems of a specific organization work (Brown and Duguid 1991). Finally, process innovation typically incorporates more hardware and requires more specialized knowledge than product innovation (Gopalakrishnan and Bierly 1997). For example, in order to develop a new automobile, R&D and marketing people should work together. For the most part, innovation may be led by technology people, because technology people understand processes. Effectively changing a process, however, requires the involvement and understanding of everyone within a company. Indeed, process innovation requires some degree of change to every sub-process of an organization. Taking all of this into account, the following proposition is proposed:

P2: Process innovation is more complex than product innovation.

Because process innovation is more difficult for members of an organization to learn and more complex than product innovation, process innovation is also more difficult for competitors to copy. Currently, most automobile companies have very similar levels of technology, together with high levels of reverse-production skills. Consequently, automobile companies are able to imitate the new models of competitors within several months. In contrast, a company cannot immediately imitate a new manufacturing process, because process innovation requires wholesale process change. To the extent that any company can imitate the process changes of a competitor, the replication will require more than a couple of years. Accordingly, the following proposition is suggested:

P3: Process innovation is less imitable by competitors than product innovation.

Product Lifecycle: Adoption Order

The product-process pattern posits that product innovations are introduced first to respond to a market need, while process innovations follow to support and facilitate the implementation of the product innovations and to enhance their contributions (Gopalakrishnan and Damanpour 1994). That is, in theory, firms respond to new environmental conditions by first introducing product innovations to differentiate themselves from their competitors, and then by introducing process innovations for additional improvements in the operation and delivery of the products. Product innovations are primarily introduced to gain or maintain competitiveness, followed by process innovations to capture the full benefits of the new products (Gopalakrishnan and Damanpour 1997).
Current trends in the automobile industry demonstrate the above concepts. In the 1980s and 1990s, the industry tried to develop new products (new models of automobiles) and new technologies (e.g., engines and safety-related technology). However, beginning in the late 1990s, when the automobile industry entered a stage of maturity, all of the automobile companies tried to focus on production capabilities and other managerial processes. Companies in the industry made a lot of mergers and acquisitions (M&A) and strategic alliances to develop and maintain process innovation as a competitive advantage. Focusing on process innovation, Asian automobile companies such as Toyota, Honda and Hyundai began to outperform U.S.-based companies, which traditionally had been the first movers and first to focus on product innovation (Damanpour and Gopalakrishnan 1996). Considering the above discussion and examples, the following is proposed:

P4: Product innovation will be adopted more frequently than process innovation at earlier stages of product lifecycles (See FIGURE 1).

**Cost management**

The cost of implementation in the context of both types of innovation has some strategic importance (i.e., Porter 1985; Cooper and Kleinschmidt 1987). The cost of implementation is important if the firm is following a low-cost strategy, but it can also be important if the firm follows a differentiation strategy in the sense that lower costs will allow the firm more flexibility in pursuing a broader array of projects.

Product innovation, because it is more discrete, may proceed unencumbered and inconspicuously through the stages of development. Process innovation is more dependent, in the sense that it is integrated with all other systems within an organization, and consequently, the implementation process is more disruptive and time consuming (Tornatsky and Fleischer 1990). For example, as discussed, process innovation in the automobile industry requires a great deal of time and money, because companies must change every sub-process related to the production and managerial processes. Product innovation, however, requires relatively less time and money, because product innovation involves changing only some parts of whole process (e.g., design changes and new technology for some parts). Accordingly, the following proposition is suggested:

P5: Process innovation will be more costly to implement than product innovation.

**Creating a competitive advantage**

A study by Barney (1991) illustrates that in order for innovation to create a sustainable competitive advantage (SCA) for a proprietor, the innovation must be valuable, rare, in
innovations, not substitutable. Process innovations, due to their tacitness, are more difficult for outsiders to imitate. Due to the dependent nature of processes, causal ambiguity makes it difficult for competitors to know what is truly adding value and what should be imitated when it comes to replicating process innovation in the marketplace (Lippman and Rumelt 1982). Overall, it is easier to maintain the secrecy of the value-adding aspects of process innovation (Levin et al. 1987).

The success or failure of product innovation is more readily apparent to competitors. Successful product innovations can be reverse engineered by competitors, thus eroding profitability for the innovators. Even though the value of process innovation is not as obvious as the value of product innovation, process innovation is critical to the long-term success of a firm, because process innovation supports the products and improves the long-term efficiency of the firm, leading to more SCA for the firm. Accordingly:

P6: Process innovation will be perceived as being more effective than product innovation in creating SCA for firms.

Through discussion of the two types of innovation and their differences, several propositions related to strategic marketing issues are stated above. The propositions are summarized in TABLE 2. The final section discusses some of the implications of this paper and suggests several research directions for future studies.

**Discussion and Conclusion**

This paper produces several implications for both managers and researchers in the field of strategic marketing, and particularly, in the study of innovation in marketing. First, the differences between product and process innovation are important for both scholarly and practical purposes. Our distinction builds on previous literature, and several real examples from the automobile industry help clarify a framework of understanding for innovation in organizations. Subsequently, a comprehensive comparison between the two types of innovation facilitates a better understanding of the relationships between strategic marketing issues and different innovation characteristics.

Considering the different characteristics of both types of innovation also aids in integrating research across scholarly disciplines (this paper focuses on the area of strategic marketing). With respect to strategy, this paper and its propositions may facilitate links with research on issues such as the accumulation and deployment of resources (Grant 1996), the formulation of strategy (Bierly and Chakrabarti 1996), and the development of sustainable competitive advantage (SCA) (Prahalad and Hamel 1990).

In terms of innovation management, comparison of the two types of innovation provides marketing practitioners with guidelines for better management of product and process dynamics. This paper focuses on innovation adoption and discusses how different factors and characteristics influence the adoption process. An awareness of the different features embodied in each type of innovation could potentially inform decisions about staffing and the assigning of personnel, the design of organizational contexts, and the planning and structuring of processes.

This paper does not cover all aspects of the topic, so future research should discuss and include more factors that influence both types of innovation adoption and innovation outcomes. Additionally, this paper only briefly discusses the results of innovation (e.g., SCA), which are critically important for companies in adopting and considering innovations. Also, this study does not consider managerial impact or control of innovations. Managers have the power to make decisions about whether or not a company should pursue innovation, as well as which types of innovation to consider. Another important issue is whether there are interdependencies between process and product innovations, in the sense that when firms introduce new products in the market, there emerges a need to improve the processes by which the products are made and distributed.

We might also benefit from additional research addressing the relative importance of product innovation, process innovation, and combined innovation in industries other than the automobile industry. This research suggests that process innovation provides greater benefits than product innovation in mature markets, such as the automobile in-

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<th>Proposition</th>
<th>Focus</th>
<th>Product Innovation</th>
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<tr>
<td>Proposition 1</td>
<td>Speed of Adoption</td>
<td>Fast</td>
<td>Slow</td>
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<tr>
<td>Proposition 2</td>
<td>Complexity</td>
<td>Simple</td>
<td>Complex</td>
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<tr>
<td>Proposition 3</td>
<td>Adoption order</td>
<td>Early stage of PLC</td>
<td>Late stage of PLC</td>
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<td>Proposition 4</td>
<td>Imitability</td>
<td>Easy</td>
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<td>Proposition 5</td>
<td>Implementation cost</td>
<td>Less costly</td>
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<td>Proposition 6</td>
<td>SCA</td>
<td>Less effective</td>
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dustry. It would be useful if these propositions were discussed and actually tested across firms in many industries to validate the applicability of this research more generally.

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