

Product and Service Innovation: Ideas for Future Cross-Disciplinary Research

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Introduction

The second annual Product and Service Innovation Conference was held in February 2005 in Park City, Utah. The conference brought together over 40 distinguished and upcoming scholars from 30 flagship universities all over the United States. The purpose of the conference is to unite leading scholars in the fields of operations management and marketing and to promote an open dialog among different academic fields on the subject of product and service innovation. The conference provides a venue where participants have ample opportunities to learn about advances in innovation research, to leverage each other's work, and to discuss future research directions.

The conference is designed to support cross-disciplinary research and to bridge the divide between marketing and operations approaches to studying innovation. Marketing and operations "are two components of one of the first economic paradigms that a management student encounters—the point of tangency between the production–possibility frontier and consumer preference curves. Unfortunately, the relationship between these two functions has often been uncomfortable if not adversarial" (Karmarkar, 1996, p. 125), thus creating an interdisciplinary divide and limiting the research opportunities in this area. The underlying reasons for the existence of this divide between operations and marketing were explored during a panel discussion that wrapped up this year's conference.

The main culprits identified for the lack of cross disciplinary research include the lack of acceptance of paradigm breaking or shifting research, the shortage of publication outlets, and the negative stigma associated with cross-disciplinary research by the research community. Although cross-disciplinary research is vital to studying innovation, many challenges prevent the advancement of this type of research. The purpose of this article is to summarize the

challenges faced today by cross-disciplinary scholars and also to address the future research priorities in this area.

The present article is organized as follows. First, the current issues in cross-disciplinary research are discussed, as well as ways to overcome some of the obstacles that deter the field's development. Next, cross-disciplinary research priorities are presented as identified by previous literature and conference panel discussions, as well as the ranking of these priorities resulting from the present survey study. Finally, the implications of the findings on the future of cross-disciplinary research are discussed.

Background

Current Issues in Cross-Disciplinary Research

In an academic arena, the synthesis of various fields (e.g., science and humanities) has been a point of contention for a long time. Established scholars have argued that when knowledge gets highly specialized, the spokes of the wheel get further apart and start to pull in different directions, deferring progress (Krasny, 2005). In recent years, the academic community has entered a so-called age of specialization. Now, knowledge is not only differentiated among different academic fields, but the differences within subfields are becoming vast and at times irreconcilable. Within business schools specifically, closely related fields like marketing and operations are heading in separate directions, creating discipline specific languages, paradigms, research priorities, and standards and making broad issues like innovation difficult to study.

During the conference, it was noted that young researchers' desire to pursue cross-disciplinary research was being impacted by the fact that tenure is usually determined through the work individuals have done in discipline specific areas, which often downplays their cross-disciplinary work in their research portfolio. For example, conference participants pointed out that they were yet to learn of a researcher receiving tenure while having a joint appointment in different business school departments like operations and marketing. Several tenured professors confessed that despite their own engagement in cross-disciplinary research, they have advised their students and junior colleagues against it prior to receiving tenure. In addition, cross-disciplinary educational programs tend to be perceived as less important and, as a result, are the first ones to be sacrificed at times of fiscal exigency (Krasny, 2005), which is a permanent state of many educational establishments.

Articles in cross-disciplinary journals, such as JPIM, can have a great impact yet despite high citation rates many business schools downplay their importance during the tenure review process in favor of discipline-specific publications. This results in a lack of research outlets for cross-disciplinary research. For example, many marketing departments emphasize Journal of Marketing, Journal of Consumer Research, Journal of Marketing Research, and Marketing Science when making tenure decisions. To be fair, this occurs in part because these journals tend to be more widely read within the marketing discipline.

One solution to this discrepancy is to argue that people are building a reputation in an area like product development rather than in a discipline like operations or marketing. However, it still seems inevitable that at least in the near future, tenure in many schools will require a significant number of publications in top-tier journals in a researcher's primary discipline. It was agreed on that a further push for acceptance of cross-disciplinary publications is crucial for attracting new scholars to the area. Special issues in established discipline-specific journals are of particular value to this type of research because they allow young faculty an outlet to publish their cross-disciplinary work without impairing their tenure prospects.

Overall, there is a general feeling that it is harder to get cross-disciplinary research published, especially if it is outside a traditional paradigm. As Shugan (2004) pointed out in his editorial on research opportunities in advancing technologies, "Academic research in marketing often and rightfully tends to build on either well-established past research topics or to follow well-established practices in industry" (p. 474). Broader problems tend to be more challenging to research due to traditional academic hurdles of ruling out alternative explanations, internal and external validity issues, and necessity to advance the knowledge in the field by building on prior research. This puts broader, boundary-crossing research ideas at risk.

The attending scholars also placed some of the blame for the lack of interface research on the research community itself, stating that it is reluctant to accept cross-disciplinary research. Several researchers have received reviewer comments to the effect that "this is interesting, but it is not marketing (or operations)." Panel participants stated that cross-disciplinary research is often criticized by both parent disciplines for breaking existing paradigms and for using borrowed terminology not easily accepted in the field. Reviewers do not always have sufficient background in another discipline to understand and appreciate the contribution of cross-disciplinary work. This type of research becomes even more difficult to tackle when the researcher is trying to look outside operations and marketing realms for ideas or research methods. Tolerance and acceptance should be granted to cross-disciplinary work, leaving the "mopping up" (Kuhn, 1970) task to future research. More forum opportunities for scholars with cross-disciplinary interests are also necessary to foster idea generation, to gain momentum for new theories, and to gain a wider acceptance for the field.

In light of these challenges, three issues were identified as crucial for the successful development of cross-disciplinary research: (1) generating critical mass around new emerging issues; (2) the need for more forum opportunities that fuel cross-disciplinary research; and (3) the need for wider acceptance of cross-disciplinary work. It was also acknowledged that these issues are interrelated and could not be addressed in isolation. For instance, paradigm-building activities that bring more critical mass to interface issues may increase the chances of cross-disciplinary work being published in respected journals, which in turn may lead to its wider acceptance. The existence of paradigms with wide academic acceptance would increase forum opportunities and idea generation. Researchers need to be able to demonstrate the importance

of their cross-disciplinary research to base disciplines, and editors need to be more tolerant of this type of research.

Overarching Research Directions

Paradigm building. Conference participants looked into grouping current research ideas together. For example, a momentum is needed around problems in new product development. Currently, no theory or paradigm of product innovation exists. Some may suggest that Christensen's work (Christensen, 1997; Christensen and Raynor, 2003) has gained paradigmatic status throughout the years. However, conference participants identified several inconsistencies between his and subsequent works that need to be reconciled if future research is to build on his theory (see also Danneels, 2004). Concentration of the research community on new issues and interdisciplinary conferences similar to the one in Park City were viewed by participants as crucial to generating the needed critical mass around product innovation research.

Process-based view of innovation. An interdisciplinary divide has a negative impact on the advancement of knowledge in innovation. Dividing the product development process into discrete marketing and operations realms "assumes a particular functional organizational scheme and masks the microstructure of the interdependencies in development decisions" (Krishnan and Ulrich, 2001, p. 13). Krishnan and Ulrich (2001) suggested that one solution to the problem is to consider clusters of decisions that are highly interdependent and are involved in the product development process as the driving force behind the organization of research problems rather than to adhere to traditional silo structures (Krishnan and Ulrich, 2001). In addition, the topic of integrative processes also was addressed in the recent Journal of Product Innovation Management special issues on "Marketing Meets Design" (January and March 2005).

Emerging themes. The conference discussion panel noted that the economy today is experiencing system shocks usually associated with spurs in research. Similar to the quality revolution of the 1980s, today's economy is exposed to shocks capable of generating new and interesting research venues. The areas of research identified at the conference incorporated some insights that have been presented in previous operations and marketing literature (Hauser, Tellis, Griffin, 2005; MSI, 2004) as well some original insights. These areas could be grouped into four general categories: the technological landscape evolution, organizational development changes, innovation settings expansion, and management of organic growth.

Evolution of technological landscape. Recent success stories involving open-source software development process prove that this area deserves more attention from researchers. The open-source environment is functioning under rules not previously encountered in marketing-operations literature. Therefore, the theories related to product diffusion, motivation, and networks need to be tested and reexamined in this setting. Furthermore, advances of Internet commerce and the development of new information technologies that

allow one-to-one marketing, mass customization, and user customization are having a huge impact on commerce and must be looked at in greater detail. One challenge is researching situations where the advancement in information technologies influences the management of product development (Krishnan and Ulrich, 2001). In addition, dispersed innovation and concurrent development provide researchers and managers with a new set of challenges.

Changes in organizational development. There is an ongoing trend toward the outsourcing of both manufacturing and design processes (Caputo and Zirpoli, 2002), which has profound implications for strategic marketing and management. Outsourcing innovation has gained importance among the business community, due to R&D being the last controllable expense with cost-reduction potential (Engardio et al., 2005). Business Week reports that even though it is still taboo to talk openly about outsourcing vital innovation-related functions such as design, most large companies engage in this type of practice (Engardio et al., 2005). This puts a new spin on one of the important topics outlined by Marketing Science Institute (MSI) as a research priority, namely on the role of design in developing successful new products and services (MSI, 2004). As outlined in special JPIM issue on "Marketing Meets Design," integrating operational design and marketing efforts is crucial to successful management of innovation (Lawrence and McAllister, 2005a, 2005b). Lawrence and McAllister (2005a, 2005b) not only outline conceptual advantages of integrative cross-disciplinary approaches to innovation but also provide real-life evidence of companies thriving due to their implementation.

In addition, globalization of innovation related activities adds to the network complexity of organizations. Networks are becoming more global and amalgamated. In this setting, management of distributed development and virtual teams is vital to successful product development (Hauser, Tellis, and Griffin, 2005). Traditional marketing and operations research methods are not necessarily the most suitable for studying intricacies of communication; thus, borrowing methodologies from human resources and organizational behavior seems to be inevitable.

Expansion of innovation settings. It was pointed out by several researchers throughout the conference that service research is particularly valuable today, since over 80 percent of the overall U.S. economy is service oriented. Yet today's research is still primarily focused on product innovation (Chesbrough 2004). To further the knowledge in service innovation, research that explores the opportunities and risks specific to service innovation as well as choice sets for system design are needed (Chesbrough, 2004). One example of expanding innovation settings is to utilize and leverage the knowledge from new product development and to apply it to new service process development. As a result, one of the urgent research priorities is to develop new frameworks and methods that deal specifically with complex service environments.

In addition, the shortening of product life cycles and the emergence of disruptive technologies have made radical and rapid successive innovation research extremely important. Therefore, there needs to be a reassessment of the role of marketing research in discontinuous

innovation (MSI, 2004). In today's fast paced world, customers have become more demanding and innovative (Rungtusanatham and Forza, 2005). Thus, there is a need to ensure customer-relevant innovation in all stages of new product and service development (MSI, 2004). The participants also noted that future research should be structured around processes rather than products, which would allow for more encompassing cross-disciplinary approaches to research topics.

Managing organic growth. Disruptions in the market are common, and a proactive understanding of consumers is crucial (Hauser, Tellis, and Griffin, 2005; MSI, 2004). Research is needed in the early stages of product development to determine methods for understanding customer needs and wants for radical innovation, specifically consumers who are first to use the product. Using emergent customer needs as inputs, concrete tools must be developed to predict market disruptions. Another research priority in this area is studying discontinuous growth strategies that reshape industries. Furthermore, product development research is now focusing on product line and portfolio selection management that obtains a balanced and profitable portfolio (Hauser, Tellis, and Griffin, 2005; MSI, 2004). Research challenges in portfolio management include improving selection procedures for strategic portfolios, improving methods in relating portfolio decisions with performance outcomes, determining the effects of differences in industry and goals of portfolios in relation to project selection, and using an options thinking approach in managing the risk and long-term outlook of portfolio management.

Whereas previous work has outlined future directions for cross-disciplinary research, the present article builds on the existing literature by providing a set of concrete research opportunities that leverages the input of a distinguished group of operations and marketing scholars and editorial board members.

Methods

During the last day of the conference, participants were asked to generate future research ideas in an attempt to identify top research priorities. The results were shared in an open forum discussion and then later were compiled into 16 main topics. Based on the results of the panel discussion, a follow-up survey containing these 16 items was administered to the participants via e-mail. Figure 1 presents the future research priorities determined by conference participants. The survey asked past conference participants to rank the resulting research topics as higher, average, or lower priority. The survey also allowed the respondents to provide any additional future research topics in case something was overlooked during the panel discussion.

Based on the ranking provided by conference participants, the research topics were grouped as either a higher, medium, or lower priority. Having prominent academicians and members of editorial boards provide their opinion of the importance of each topic provided the ability to narrow the opportunities to the topics capable of advancing cross-disciplinary

knowledge. It also should be noted that in the future obtaining input from practitioners would be invaluable in ensuring that future research is aligned with industry needs.

- Marketing–operations interface
- Finding a common interdisciplinary language
- Integration of research methods (modeling and empirical methods)
- Bridging the gap between managerial practice and academic research
- Radical innovation–really new products
- R&D and product design
- Resource-based view of innovation
- Creative process in innovation
- Product development in entrepreneurial and growth companies
- Network issues in innovation and product development
- Co-development and collaboration among firms
- Managing the service process
- Service innovation–new service development
- Use of IT in a customer service setting
- Pricing and quality decisions
- Product line optimization

Figure 1. Future Research Priorities

Results

Table 1 presents the results of the future urgent research priorities. However, it should be kept in mind that all the topics included in this list were identified by participants as being “most important.” Thus, a research topic labeled as a lower priority should not suggest that the topic should be disregarded as not important. All of the provided research priorities are important, but some are more urgent than others. It also should be noted that self-selection bias may have influenced some of the findings since participants’ own research interests and backgrounds could have predisposed their views on how they would like to see the field evolve.

Even though operations and marketing have their distinct traditional realms, it has been identified in previous literature that cross-disciplinary approaches to problems and integration of multidisciplinary research methods may lead to more effective solutions (Karmarkar, 1996). Therefore, it is not surprising that the highest-ranking research topic identified by the survey is *marketing and operations interface*. Also, consistent with previous literature, the *integration of research methods* was seen as a high priority area (see Hauser, Tellis, and Griffin [2005] for concrete ideas on research methods integration).

Another fruitful direction for further research is changing the scope of problems. For example, operations management has a long history of gravitating toward certain industries

and products. This field could benefit by leveraging the experience of marketing colleagues in studying less traditional realms such as the service environment and *creative process in innovation*. One example brought up at the conference of creative process in innovation is researching different settings, such as movie studios or record labels. Moving away from the corporate environment and putting more of an emphasis on private and entrepreneurial ventures also would be seen as an area of interest by conference participants. The panel discussion outlined the need to depart from exclusively studying product innovation in terms of product dimensions. Instead, conference participants proposed that research incorporating creativity as a driver of product development success is needed.

Higher Priority	Medium Priority	Lower Priority
Marketing–operations interface	Finding a common interdisciplinary language	Resource-based view of innovation
Integration of research methods (modeling and empirical methods)	Radical innovation—really new products	Managing the service process
Creative process in innovation	R&D and product design	Use of IT in a customer service setting
Co-development and collaboration among firms	Product development in entrepreneurial and growth companies	
Bridging the gap between managerial practice and academic research	Network issues in innovation and product development	
	Service innovation—new service development	
	Pricing and quality decisions	
	Product line optimization	

Table 1. Rankings of research directions

With increased complexity of business alliances and continuing globalization, *co-development and collaboration* among firms is another promising research area. Adding to the traditional resource-based view of such alliances are the alternative methods widely employed in organizational behavior, yet remaining in their infancy in both marketing and operations fields.

As Krishnan and Ulrich (2001) state, “One of the requirements for the product development research is that it must be tightly motivated by the needs of industrial practice” (p. 15). Consistent with this notion, *bridging the gap between academic research and managerial practice* surfaced as a top priority item. Even though applied cross-disciplinary research is often perceived as less academic by the research community, this type of research closely resembles the business world’s true complexity and is very attractive to practitioners because of its ability to provide concrete managerial insights. Also, conference participants noted that research bridging the gap between academia and the business world is capable of generating goodwill between the scientific and academic communities, thus providing the vital access researchers so desperately need.

Research topics considered a medium priority include radical innovation as well as *service innovation*. Lower-priority research topics include *resource-based view of innovation and the use of information technology (IT) in a customer service setting*. Recall that a research topic categorized as medium or lower priority does not mean it is not important: Being included on the list at all means the topic was deemed an important area of study by academic scholars. Also, two additional topics emerged from the survey as future research directions: the topic of

intellectual property and technology transfer and the idea of *customers as innovators*. All research priorities provided in Table 1 are needed areas for future study, but the most urgent priorities are marketing–operations interface research, integrating of research methods, creative process in innovation, co-development and collaboration among firms, and bridging the gap between academic research and managerial practice.

Discussion

Both the survey and panel discussion allowed many interesting topics to rise to the surface. The majority of the opinions and rankings support the notion that there is a need for cross-disciplinary research melding the fields of marketing and operations management. The panel discussion also supported the notion that other fields beyond operations and marketing have tools and theories that can be valuable in studying innovation. A 2005 MSI report stated, “While Marketing has been studying innovation for some time now, it could benefit greatly from incorporating advances in the fields of quality management, operations management, management of technology, organizational behavior, product development, and strategic management” (Hauser, Tellis, and Griffin, 2005, p. 112).

During the concluding session of the panel discussion, participants proposed more specific cross-disciplinary areas for study. The ideas ranged from combining the disruptive innovation research with cutting-edge meta-attribute conjoint models to advancing operations management models designed to solve inventory chaos to guide companies involved in helping to pace successive product introduction. Another identified opportunity to broaden the scope of research options is to take a more global prospective on innovation. Cross-cultural studies widely accepted in marketing and consumer behavior are still in their infancy when it comes to product innovation. Research needs to focus on the major drivers of innovation and the effect innovation has on economies over time. Additionally, providing meaningful ways of tracking the effectiveness of research and development (R&D) activities has been long seen as a very important component of a business’s success. Participants agreed with MSI that assessing the effectiveness of the new product development process is of vital importance (MSI, 2004) and that more research is needed in this area.

Conclusion

Even though cross-disciplinary research has been gaining wider acceptance in recent years due to its ability to reflect business world phenomena, and thus its relevance to managerial practice, several issues still hinder its development, including the stigma attached to cross-disciplinary research within the scientific community, the scarcity of established paradigms, and the lack of an overall agreed on direction for future research. Hopefully the suggestions provided in this study may foster the development in the field by providing ways of alleviating some of the pressing concerns experienced by cross-disciplinary researchers as well as providing new opportunities for cross-disciplinary research.

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Biological Sketches

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