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This is a so-called personal version (author's manuscript as accepted for publishing after the review process but prior to final layout and copyediting) of the article: Dube, A 2014, 'Customer Identification of Service Innovations based on Everyday Innovation Experiences' in AMA SERVSIG 2014 International Service Research Conference Proceedings: *Services Marketing in the New Economic and Social Landscape*, pp. 28-29.

<http://hdl.handle.net/10138/136387>

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## SERVICE DESIGN/INNOVATION IN SERVICES

### 43. PERCEIVED PRODUCT IMITATION, PERCEIVED INNOVATIVENESS AND VALUE PERCEPTION

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**Purpose:** The study contributes to the service innovation literature through examining the impact of perceived product imitation on perceived innovativeness and mediating effect of three perceived innovativeness constructs on value perception. The three innovativeness constructs are perceived service innovativeness, perceived brand innovativeness, and perceived firm-innovativeness. The study is important because previous work has studied the innovativeness constructs separately leading to the incomplete picture of their roles.

**Methodology:** Survey data were collected from 145 young South Korean consumers who own Samsung Galaxy smartphones. Among others, the participants were asked to indicate their perceptions regarding to what extent Samsung Galaxy smartphone imitates Apple smartphones. Partial-least squares method was used to test the mediation model.

**Findings:** Perceived imitation negatively influences all the three perceived innovativeness constructs. Interestingly only perceived service innovativeness mediates the effect of perceived product imitation on the value perception. The results suggest that only perceived service innovativeness is relevant to the value perception of consumers when they view that imitation exists. The direct effect of perceived brand innovativeness and perceived-firm innovativeness were insignificant.

**Originality:** For the first time the imitation perception is examined in relation to the three types of perceived innovativeness. The results imply that perceived imitation has quite an impact to the image of innovativeness of a firm, and indicate that innovations in services may serve an effective strategy to reduce the impact of perceived imitation of a ‘copycat’ product on value perception.

**Practical implications:** The study was conducted in the context of a world leading brand perceived to imitate another world leading brand. The study has practical implications for companies that attempt to mitigate the negative effect of copy-cat perception. Being innovative in their service offerings seems to reduce the effect.

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## 55. Holistic Service Design

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**Purpose:** The purpose of this paper is to describe a service design methodology that is holistic, in the sense that four major stakeholder groups are considered equally important. Most service design methodologies focus on customers and the service provider organization as principal stakeholders, we enlarge this to consider both service delivery personnel and society as a whole as first class stakeholder groups.

**Methodology:** We propose a method for designing or re-designing services that captures value not only for customers and service providers, but also for service delivery agents, and for society as a whole. We base our ideas on familiar service design paradigms like those of Stickdorn and Clatworthy, but we extend their methods with explicit focus on the four groups of stakeholders above. Typically artifacts produced in the design process are business plans, customer journeys, and service blueprints. We propose additional artifacts representing the personas of all the individuals involved in service delivery and their daily experiences. We advocate an explicit statement of social value for the service design, together with a plan for measuring and monitoring the social impact of the service.

**Findings:** The methods have been piloted with groups of students in an MBA course on Service Design, and their designs will be presented at the Conference. Negative impacts of failing to include one of the stakeholder groups will also be discussed.

**Social Implications:** Services designed with this method consider sustainability and social welfare as key outcomes of the service design process.

**Value:** The value of this work is its exploration of expanded service design methods with new design artifacts to improve the value generated for all stakeholders in a service system.

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## 87. DESIGN FOR SERVICE INNOVATION AND DEVELOPMENT. A SCOPING STUDY

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**Purpose:** This paper aims to question and position Service Design's contribution and impact into New Service Development processes and to identify knowledge gaps and research potentials to enhance Service Design integration and contribution to service innovation.

**Methodology:** This paper uses case study as a research strategy (Yin 1994:13). As Service Design emerges as a mature field, a multiple case study method offers a timely and systematic approach to gather data. The unit of analysis for each of the three case studies is a Service Design project chosen by the agency that best represents their approach to delivering and implementing a client project. To support the data collection and analysis, a theoretical framework and propositions have been formulated based on a systematic literature review on Service Design, New Service Development, and Service Innovation.

**Findings:** In contrast with a definition of service design as a phase within NSD ([Edvardsson et al., 2000](#)), this research discusses Service Design as an approach to service innovation that can inform the overall NSD process. A distinction here is made between contributions from specific design skills

(graphic design, web design, co-design, etc.) and from design as an attitude. Different challenges and needs have emerged when adopting this approach within existing organisations (i.e. conflicts between art and science logics), when using it to design and develop new ventures (i.e. maintaining design attitude across the innovation and delivery teams) or when trying to measure its value and impact.

**Originality:** Systematic studies on how Service Design agencies operate in practice and how they contribute to service innovation and development are very limited (Kimbell, 2011; Zomerdijk and Voss, 2011; Stigliani and Fayard, 2010). This paper provides an interpretative framework and propositions to question and document how Design is currently applied and could be better applied within service innovation and development processes.

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### **93. TURNING CUSTOMER FEEDBACK INTO GOLD: CHALLENGES AND HINDRANCES**

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**Purpose:** Despite the fact that the service innovation and complaint management literature address - independent from one another - respectively positive customer feedback in the form of suggestions/ideas and negative customer feedback in the form of complaints, no research has considered both forms of feedback simultaneously. This paper aims to address this issue by (1) comparing and contrasting the content of both types of customer feedback, and (2) investigating organizational practices that help firms to act upon both types of customer feedback.

**Methodology:** Managers of 145 nursing homes participated in an online survey. Nursing homes are high-contact services where customers have plenty of opportunities to give both positive and negative feedback. We gathered information about the content of both types of customer feedback and organizational practices to act upon both types of customer feedback through open-ended questions. These qualitative data were analyzed with Nvivo10.

**Results:** The results demonstrate that the content of positive and negative customer feedback largely overlaps: customers give both positive and negative customer feedback in relation to environmental, interactional, administrative, and technical quality. Regarding the degree to which firms act upon customer feedback in relation to these quality dimensions, the results demonstrate the importance of a customer-oriented culture, a commitment-based strategy, and innovation capacity.

**Originality/Value:** By focusing on challenges and hindrances to act upon customer feedback, this paper contributes to an understudied field to date. It also contributes to the literature by examining positive and negative feedback simultaneously. From a managerial viewpoint, this research calls for managing positive and negative customer feedback in an integrated fashion, as both contribute to improving and innovating existing service offerings to better meet the customers' current and future needs.

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## 99. DESIGNING TO SERVE: INTEGRATING DESIGN AND MARKETING IN SERVICE SCIENCE

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### INTRODUCTION

Recently, the world has seen enormous changes in the power to rapidly and efficiently serve both matter and information when, where, and to whom required. New Technologies result in smaller, smarter, and more affordable devices that serve users in almost every way and all the time. These innovations not only provide users with control and communication capabilities, but also can adapt, be shared, be personalized, facilitate a vast number of social interactions and movement of matter, etc. In a fundamental way, the new technologies lead to increasingly near universal access to empowering a rapidly growing number of individuals in fulfilling their potential and goals. In other words, the new bundles of matter and knowledge serve users in the pursuit and achievement of their goals. Their principal role is to serve their users. Thus, the study of what has been termed “service science” has become ever more important for enterprises.

As service science develops, there is a need for a formal scientific framework for the development of innovative services (Thomke, 2003; Frei, 2006); much as formal R&D frameworks exist for tangible products. In this paper, we review the relevant literature from marketing science, service science, and design science. Our main goal is to argue that existing marketing science and service science frameworks possess some limitations that can be overcome when combined with principles from design science. Based on this review, we propose a new framework for the design of innovative services that combine several key paradigmatic approaches for design science with marketing and service science principles and identify two fundamental open research issues for developing service innovations further into a scientific endeavor.

### MARKETING AND SERVICES SCIENCES’ APPROACHES TO NPD

At the broadest level, Maslow’s hierarchy of needs informs marketing science on a taxonomy of needs, conditions under which they arise and that they may be viewed as being hierarchical in nature. Some needs are of a higher order than are others. While there has been criticism on Maslow’s hierarchy, particularly from those who think it is idiosyncratic to individualistic societies and does not apply to collectivist societies. At the broadest level, the hierarchy still provides relevant insights for new product developments and innovation. For example, with the urbanization movements under way in large parts of the developing world such as Asia, there are significant pressures on basic needs of shelter, food, water, and sanitation. Marketing is informed by such a taxonomy of needs. Typically, qualitative marketing research (such as focus groups, interviews, observational research) might be used to identify these needs that are not being currently served or not being served adequately enough. Then, quantitative research methods might be used to measure these needs more precisely as well the size of related market opportunities.

In the 1980s and 1990s, as the awareness of the inefficiencies in new product development grew in the marketing science community, considerable effort began to be invested on research into improving the new product development process itself. The desiderata became to launch new products that served user needs with the right quality at the right time. To do so, it was realized, that the design process itself had to be team based and approached systemically. Particularly, three sets of techniques have had significant impact: Lead User Analysis, Voice of the Customer, and Conjoint Analysis.

**Lead User Analysis (LUA).** Lead user analysis grew out of the work of Von Hippel (1986) in understanding the role of users in innovations. The fundamental breakthrough in this stream is the insight that in many contexts there exist users whose needs exceed the capabilities of current products in a market and thus have already innovated solutions to address their specific needs. Lead user

Analysis is then a process by which such users may be identified and their knowledge of needs and solutions be used to develop commercial and scalable products.

**Voice of the Customer (VOC).** Griffin and Hauser (1993) introduced VOC as a methodology involving both qualitative and quantitative marketing research for developing a set of user needs, clustering them into attributes and then attaching importance weights to them. These attributes and their corresponding weights then govern the design process.

**Conjoint Analysis.** The conjoint analysis methodology provides a theory of measurement for calibrating user importance weights for the various features/attributes of a product and for measuring the trade-off values users attach to giving up one level of a feature versus another. Customer measurements are based on obtaining their preferences and perceptions for a set of stimuli that are presented to them using an appropriate experimental design. These measurements are then used to develop optimal new product positions (Green and Srinivasan, 1990). These techniques were proved of limited use in service contexts when products are intangible and innovation essentially process-based. To overcome these limitations, several frameworks have been developed by service scholars to help the design and development of new services. Among them, a few have been extensively used in practice and studied: Blueprinting, Critical Incident Technique, and Co-Creation.

**Blueprinting.** The first theme is best represented by the Blueprinting process proposed by Shostack (1984). Blueprinting is the mapping out of a service journey identifying the processes that constitute the service, isolating possible fail points and establishing the time frame for the journey. The Servicescapes work of Bitner (1992) also fits into this framework, as it provides an understanding of the impact of physical surroundings on customer and employee behavior. It highlights the need to incorporate physical surroundings in the design of services.

**Critical Incident Technique.** Flanagan (1954) describes CIT as a “flexible set of principles which must be modified and adapted to meet the specific situation at hand” (p. 335). The five principle elements of CIT are: 1) determine the general aims or goals of the activity under investigation; 2) specify the situation to be studied and identify the participants or observers best suited to provide feedback about the phenomenon; 3) collect the data; 4) analyze the data; and 5) interpret the data and report the results. One of the main advantages of CIT is to collect data about a phenomenon in its natural setting. The data are collected as a narrative in the words of the respondent from his or her own perspective, which helps uncovering naturally occurring patterns, or events, which affect the outcome of the service under investigation.

**Co-creation and Co-production.** Hilton and Hughes (2008, p. 22) have examined a certain aspect of co-creation by looking at the result of co-production in the application of self-service technology. Their conceptual framework supports that the concept of co-production emphasizes the need to understand “productivity from the point of view of the customer, and demonstrate how this can be applied in both the consumer and inter-organizational contexts”. It is mentioned that service organizations would benefit from identifying co-production with task performance and co-creation with the “value-contributing aspects” of the customer service experience.

As usefully these marketing science and service science techniques could be they are mostly ad-hoc and unsystematic, which might leave out better solutions or more creative innovation. Principles from design science might help us to overcome these limitations.

## **DOMINANT DESIGN PRINCIPLES**

The embryonic service design literature is fragmented and often consists of examples followed by particular firms. There are three core dominant approaches to a science of design and innovations: The first follows the work of Suh and his axiomatic design principles (1990). The second follows the TRIZ methodology (also referred to as The Theory of Inventive Problem Solving, Sushkov, Mars, & Wognum, 1995) originally developed by Genrich Altshuller and his colleagues. The third is an approach developed at the University of Bath to bring the works of Suh and Altshuller together.

**Suh’s Axioms and Approach.** Nam Suh has brought science to the art of design and his 1990 and 2001 books are paradigm setters (Suh 1990, 2001). In these books, Suh describes the process of design as starting with identifying user’s needs, specifying the corresponding functional requirements, creating the design parameters, and identifying the process variables and constraints. The process

links the functional requirements and the design parameters through a design matrix following his axioms. Then, a process of ideation and creation follows. The outcome is compared to the requirements and his axioms, and iteration process carried out until a satisfactory solution is obtained. The two axioms that govern the process of arriving at the best solution are:

- The *independence axiom* states that the independence of corresponding elements from domain-to-domain should be maximized.
- The *information axiom* states that the information content of a design should be minimized.

The information axiom provides the basis for choosing between alternative designs that satisfy the independence Axiom for a set of user needs. Its goal is to maximize the chances that a solution design will have the best chance to succeed. So, for example, a voice recognition system with the ability to span a variety of accents will be superior to one with the ability to a narrower range of accents. In general, a solution candidate may deliver a set of outcomes of which a subset may be the desired outcomes. The superior solution will be the one for which the number of possible outcome to the outcome desired is a minimum. For example, if a voice recognition system outputs several alternatives based on a single voice input, it will be inferior to one producing one unambiguous and correct output.

**The TRIZ Approach.** Altshuller's story of research in the former Soviet Union immigrated to the U.S. by followers of his work and the establishment of the TRIZ Institute in Boston in 1995 are "stuff of legend." TRIZ starts with identifying a simple problem. The abstract contradiction that causes the problem not to be solved is then identified. Using the TRIZ patterns an abstract solution to resolve the contradiction is found which then leads to a specific solution. Trial and error iterations then lead to a final solution. The core of the TRIZ approach consists of using a knowledge base of solution directions or inventive principles to solve an identified set of contradictions. Originally, 40 principles were identified and formed the knowledge base of the approach. In 1973, Altshuller replaced his original 40 principles for resolving contradictions with a system of inventive solutions that are made up of "Su-field" modeling and 76 inventive standards that are grouped into 5 classes of standards (Altshuller, 1988).

#### **Bringing together Suh's Axiomatic Design approach and Altshuller's TRIZ approach**

A group of scholars at the University of Bath note that the above two approaches were complementary and suggest that a synthesized approach could be developed for developing inventions. In particular, the TRIZ approach provides discipline to the Ideate and Create phase of Suh's AD approach and Suh's AD approach provides discipline to the problem identification and solution development processes in TRIZ by explicitly focusing on the hierarchical nature of the relationships between needs, functional requirements (contradictions), and design parameters.

Based on our understanding of the literature, we note the existence of an open research avenue: To develop a parallel study to Altshuller's for determining what and how contradictions have been resolved in service innovations so far and then to develop analogues to the inventive principles and the subject field that are applicable for services.

#### **Extensions to Altshuller: Sufficiency Conditions for Inventions**

Maimon and Horowitz (1999) set out to answer the question as to when a design invention is a creative design invention. They identify the prevailing theory as Altshuller's approach- TRIZ, test it by identifying inadequacies in it and then theorize a set of sufficiency conditions that they again put to test before claiming that if these conditions then a design invention is indeed a creative one.

Their testing and analysis of the TRIZ revealed two shortcomings: it is not sufficiently well defined and the solutions were not necessarily creative. Complementing TRIZ with AD is likely to alleviate the first shortcoming. Maimon and Horowitz called their new condition, which is based on Suh's Independence Axiom, the Qualitative Change (QC) condition. To ensure that the solution was creative they developed a second condition called the Closed World (CW) that restricts the type of modifications permissible for a design to be called creative. They claim and show that their conditions together provide sufficient conditions for a creative design. Their process seems to be another way to synthesize AD and TRIZ..

All the design science methods above assume that user needs are known. Thus, as useful they could be they are constrained by critical limitations: (1) based on known needs, they are mostly backward looking rather than future oriented; and (2) as such, they are rather static and not well suited to

identify how new needs might dynamically emerge. The determination of user needs and the management of the process of informing, persuading and creating user satisfaction and loyalty and pricing to ensure value appropriation from users fall under the purview of marketing and service sciences. Therefore, these different approaches must be combined.

### **PUTTING IT TOGETHER**

Several attempts to put together an integrative framework are available in the literature. August et al. (2001), Alexandre et al. (2003), Basem (2005), and Ungvari (1999) are examples of such attempts. Of these, the August, Barton and Wilson (2001, referred to as ABW in brief) is the broadest attempt at integration. It provides a set of mathematical relationships to link various spaces include design spaces and product positioning space. A motivating example from their paper is that of Amar Bose and his fundamental work in developing audio speakers. Bose (1973) describes the process of arriving at his theory of sound reproduction, his experiments that first showed how the conventional desiderata of seeking a flat frequency response was not correct, then describes experiments to arrive at the right desiderata/measurements and choose the appropriate device to fulfill the physical measurement desiderata linking to human perception (the basis for satisfactory usage experience). Alexandre, Furrer and Sudharshan (2003, referred to as AFS) propose and discuss another framework consisting of five spaces: knowledge, technology, building blocks, bundles and product variants. These are very broadly defined spaces, for examples, the product variant space is defined as the space of segments and needs, the bundles space consists of bundles of feasible and acceptable technologies. AFS suggest that new solutions are and should be developed by using either or both top down and bottom up processes, which start with scanning the knowledge space and then migrating a discovery to result as a solution for a need in a user segment. The methodology proposed for linking the spaces to study the migration and emergence of new solutions and markets was the use of cellular automata. However for specific discovery of a solution, using linkage matrices such as in QFD, AD and ABW would be more instrumentally powerful.

Core to the TRIZ approach are the substance field and 71 principles of solutions for hard technologies. An equivalent core, populating the knowledge space should include the solutions to contradictions that have been developed across various services. This can be seen from the development by Goldenberg et al. (1999) of six advertising templates (pictorial analogy, consequences, competition, intervention experiment, and dimensionality alteration). Thus the TRIZ approach could enable us to link AFS' knowledge and technology spaces. Further, the TRIZ would also allow the better of breed elements of the technology space to be moved into building block space. This is essentially a part of TRIZ.

AD could provide the links between AFS' building blocks to bundles as the use of the Independence Axiom makes this linkage more efficient. It could provide the basis on which the search for solutions becomes more efficient by restricting the linking matrix to be a diagonal matrix. Bundles space and the service variant space can also be linked by AD; its Information Axiom is helpful in the selection of better solutions. Lead User Analysis and customer co-production become important approaches to link users in problem definition, i.e., identification of the needs to be met and segments to be served. Voice of the Customer and Conjoint Analysis are important techniques for understanding user preferences with greater precision; hence, are useful for the optimization of the final solution that might include competitive analysis of anticipated competitor responses. The decision management aids of the stage gate process and other project management tools are of course important to manage a specific project. Such an integrative view also calls for the examination of the organization structure within which it will be embedded.

### **CONCLUSION**

In this paper, we provide an overview of the literature in marketing science, service science and innovation design science. Based on which we provide a brief description of a new framework to integrate the developments of these disciplines. In reviewing the literature and presenting an integrative framework, we also identify two significant open issues that would benefit from further research and hence open new research directions:



- Design science is strongly limited by the assumption that customers' needs are known. Marketing help us to uncover such needs. However, marketing science is based on market research and customer insights, which is well suited to develop incremental innovations, but less to understand radical innovations. Developing methods for measuring how customers accept and value breakthrough innovations would be invaluable.
- As services are intangible in nature and process-based, their innovation might require idiosyncratic set of inventive principles. Developing a parallel study to Altshuller's for determining what and how contradictions have been resolved in service innovations so far and then to develop analogues to the inventive principles and the subject field that are applicable for services is likely to be a fruitful direction for future research.

Future work must address these issues for service science to include the innovative design of services in its domain.

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## **100. CUSTOMER INVOLVEMENT IN DEVELOPMENT OF TOURISM SERVICES – A MULTIPLE CASE STUDY**

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**Purpose:** This study aims to test different types of customer involvement in tourism service development. The purpose of this paper is to assess the applicability of different modes of customer involvement in tourism at different stages and/or for different purposes of service development.

**Methodology:** The data were collected in six companies, two of them being destination marketing organizations and four were SMEs. Edvardsson et al. (2006) as well as Hjalager and Nordin (2011) distinguish between two different objectives in involving customers in NSD. Activities aiming to increase understanding of customer values, preferences or latent needs would refer to modes of passive customer involvement, e.g. traditional customer surveys. Activities aiming to involve the customer consciously and actively to participate in the NSD would refer to methods such as innovation camps or communities of users. The case studies are analyzed within the typology of user-driven innovation suggested by Hjalager and Nordin (2011) and typology of modes of customer involvement introduced by Edvardsson et al. (2012).

**Findings:** The findings show that The Tester mode method produced the richest input for service concept development, and The Correspondent and The Reflective Practitioner modes were best applied in the development of service process. Small firms in tourism need cooperation with universities in their co-creation activities as most of the methods of customer involvement are demanding and costly to apply.

**Originality:** Even though a few researchers have recently studied co-creation and customer involvement in service development in tourism (e.g. Prebensen and Foss, 2010; Prebensen et al., 2013; Shaw et al., 2011) there is only limited systematic and comparable empirical evidence of the level of innovative activities in tourism and hospitality industries (Hjalager, 2010).

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## **149. ORGANIZING AND MANAGING NSD: A CROSS-SECTIONAL SURVEY OF EUROPEAN COMPANIES**

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**Purpose:** Companies in most industries are struggling with organizing and managing the development of new services. They aim for designing a new service with a profitable business model resulting in high use value for customers. However, there are only few scholarly, empirical studies addressing these managerial challenges. Existing studies are often delimited to specific industries or research questions. Thus, there is a need for more empirically grounded knowledge in NSD. The aim of the study is to explore and identify important organizational and managerial factors that impact service development performance. We investigate the influence of these factors on the success rate of development projects and the resulting profits.

**Methodology:** An empirical study was conducted in six European countries (Austria, Finland, Germany, Italy, Sweden and Switzerland). The sample (n=1125) represents companies in different industries both manufacturing and services and of different size. In addition data was collected in Mexico from 229 companies.

**Findings** The results from our empirical investigation, which is the first broad European study in the area of NSD disclose strong relationships between the use of a formalized development process, a specific development organization and service development performance. We investigate the influence of these factors on performance for development projects with different degrees of innovativeness. Additionally, a depiction of the relationship between the level and ways of customer integration and company performance is also revealed.

**Originality:** Our research contributes with a large scholarly empirical investigation of NSD to test a number of research questions that have been sparsely addressed in previous research and to shed light on the main challenges companies are facing when developing new services. Based on the findings, we suggest that companies should put more emphasis on new service development to increase both the throughput of the development process and the outcome of the development projects.

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## 180. HOW CO-CREATION PRACTICES SHAPE SERVICE INNOVATION?

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**Purpose:** Service-dominant logic suggests that value creation is based on institutionalized value co-creating practices that both enable and constraint resource integration among actors. Here, innovation is understood as the co-creation of practices that provide solutions to new or existing problems (Vargo et al., forthcoming). This study asks: How these co-creation practices influence the ability of service systems (e.g., organizations, networks) to create and institutionalize new service practices?

**Methodology:** Co-creation practices are studied in two service networks following a case study approach (Yin, 2003). Both cases represent a novel solution at the service system level for co-creating value with end-users, but showcase differences in the constituting value co-creation practices. Data for both cases consists of interviews with key members of the organizations contributing to the operations of the network.

**Findings:** The tentative results suggest that three co-creation practices shape innovation in the case networks. First, *interaction practices* consist of formal systems of interaction among the members of the network, drawing attention to the maintenance of, and coordination within, the service system. Second, *integrative practices* represent activities that mediate information among network members, and facilitate constructive interaction and ongoing learning and development toward the shared goals of the network. Third, *service provision practices* capture the direct value co-creating practices toward the end users. The differences between the cases in the three practices in part explain why one in case the network was able to more radically transform their value co-creating practices.

**Originality/value:** This study extends research at the intersection of social practices and innovation (cf. Russo-Spena & Mele, 2012), drawing attention to the multiple and intertwined practices that contribute either to the reproduction or change in the institutionalized value co-creation practices in a service system.

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## 181. AUGMENTING THE SERVICESCAPE WITH UBIQUITOUS INTERACTIVE SURFACES: FIBRESHELF TECHNOLOGY

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### INTRODUCTION

Retailing, and especially grocery retailing, is a self-service business context par excellence. In order for the customer's service experience to be successful, a first condition is that the store enables the customer to get his/her goal accomplished by offering shelves that are sufficiently stocked with the

products and brands the shopper is looking for. To this end, retailers traditionally face the major challenge of inventory management. In many retail stores, stock replenishment is still not automated. This leaves the door open for human errors. Kourouthanassis *et al.* (2002) for example found that approximately 8% of all out-of-stock situations occur despite the fact that there still is sufficient stock in the back-store. Shelf management is a non-trivial task that today - almost a century after the opening of the first self-service supermarket – can still be further improved.

But there is more needed to survive in today's competitive and rather mature retail context. Retailers, manufacturers and scholars focus ever more on shopper marketing (Shankar, 2011), targeting the shopper along and beyond the entire path-to-purchase, in a multichannel, multimedia environment (cf. *Journal of Interactive Marketing*, 2010, 24 (2)). Despite the merits of electronic and mobile commerce, it is unlikely that traditional bricks-and-mortar service and retail settings will disappear; rather both channels will complement each other. Nevertheless, a proper strategic response is needed in order to sustain its role in face of these challenging changes in the technological and business environment. In comparison to the wealth of data on which online retailers can rely, things are generally quite different for traditional retailers. As such, the creation and management of marketing intelligence in function of shopper marketing initiatives can be considered a top strategic priority for the latter.

In this vein, the present study focuses in particular on the application of interactive shelfspace to digitally augment the servicescape offered by the bricks-and-mortar retailer. In the present digital era, technological developments allow for augmenting the shopping experience by amplifying the interactivity of customer relationships. Moreover, the shopper's path-to-purchase is paved with digital opportunities and 'instrumented' servicescapes have the potential of capturing and optimizing these moments-of-truth. The contribution of this article is threefold: Firstly, we reflect on strategic issues that can be addressed by turning shelf space into interactive surfaces, in terms of: (1) shelf space management, (2) gaining shopper insights, and (3) creating shopper marketing activities (cf. Section 2). Secondly, we present a concise overview of technological options to equip shelf space to sense shelf events, and focus in particular on a novel optical sensing approach, namely FibreShelf (cf. Section 3). Thirdly, a research agenda is developed in function of optimizing operations management and augmenting customer experiences by means of interactive shelfspace (cf. Section 4).

## **THEORETICAL BACKGROUND: PROBLEM STATEMENT**

### **Shelf space management: Control over the inventory?**

Shelf space has ever been a very important good in retail markets (Yang and Chen, 1999). Retailers must constantly strive for excellence in their operations. Narrow profit margins leave little room for not using shelf space or using it inefficiently. Different events can negatively impact shelf space and sales (e.g., articles in a disorderly arrangement, wrongly facing, or on the wrong shelf). One of the most common events is a product being out of stock. Empty shelf space is equivalent to a loss of revenue for both retailers and manufacturers (Raman *et al.*, 2001) since shoppers mainly respond to out-of-stock events by buying the item at another store (31%) or by substituting it with a different brand (26%; cf. Gruen *et al.*, 2002). As such, poor shelf space management results in erosion of customer loyalty and can have a long-term impact on market share.

Shelf supervision is therefore necessary for monitoring stock 'shrinkage' and maintaining shelf arrangements. Efficient handling of shelf space requires real time information concerning its status (e.g. if a product is missing, if a product is placed incorrectly in the shelf and similar). Today, shelf supervision is still often only partly automated and the stock managers manually perform the shelf supervision and replenishment. A 'perfect' human detection about shelf status is not practically obtainable. A study of Thonemann (2005) shows that human supervision can only detect 90% up to 95.7% of all out-of-stock events. Furthermore, it is also highly costly.

### **Marketing intelligence: the gap between online and offline retailing**

One of the main assets that e-commerce has over traditional retailing, is the former's access to real-time gathered data, tracking the consumer's behavior along and beyond the path-to-purchase. Although transforming such 'big data' into business intelligence is challenging to marketers and data miners (cf. MSI research priorities 2012-2014), they also offer major competitive advantages if used to their full extent. For example, e-commerce websites record how often information about a given product is requested, how long the consumer deals with this information and in the end how often the

product is actually bought. Such information serves as input for various product popularity metrics, like the average time-on-page or the click-buy-ratio (i.e., number of clicks on a product information link relative to the number of actual product sales). Online retailers use this knowledge to optimize advertising and product placement strategies as well as for recommendation systems to realize cross-selling opportunities and capture a higher share-of-wallet (Winer, 2009).

In comparison, bricks-and-mortar retail stores collect relatively very few data while a shopper is in a store. Retailers mainly can rely on data on two informed events across products' history in their store: (1) the input of the product into the store upon delivery by suppliers, and (2) the output of the product at an electronic cash point at the checkout. Decker *et al.* (2003) term this the 'input/output model', and point at the major lack of information of the history of the product within the store (i.e., 'the black box'). In order to be able to rely on more fine-grained information, to get an insight into why consumers buy a product, marketers and market research agencies typically tend to conduct consumer surveys to directly ask the consumer. Given the vast amount of literature demonstrating the gap between self-reported behavioral intentions and actual behavior, being able to observe the customer's interaction with the offered products would result in more valid results.

### **Marketing in an era of information overload**

In terms of marketing communications, the current era is incomparably characterized by media fragmentation. Marketers can (and should) rely on various media channels to increase consumers' awareness and preference for their brands (Winer, 2009). Given the increasing amount of marketing stimuli by which consumers are targeted both inside and outside the store before making a purchase, getting a message across becomes ever more difficult. Contrary to out-of-store perceptions of brands or products (Bell *et al.*, 2010), in-store stimuli are able to generate impulse purchases (Shankar, 2011; Inman *et al.*, 2009). As the majority of purchase decisions can be assumed cue-prompted or unplanned and triggered in the store (Hayes, 2005), the in-store medium is a valuable communication tool for both retailers and manufacturers, providing grounds to shift the power balance even further toward the former. Moreover, stimuli at the point-of-sale are largely controllable and manageable by the retailer. Shopper marketing therefore proposes a new paradigm in marketing, in which marketers focus on targeting the consumer being in a shopping mindset, 'while he or she is engaged on the path-to-purchase' (Shankar, 2011: 23). Acknowledging that marketing activities should address shoppers' needs as they emerge over the purchase decision making process, implies that the store environment risks getting cluttered with displays etc. As such, gaining insights in smart and unobtrusive design of servicescapes in function of shopper marketing initiatives is becoming ever more essential.

### **INSTRUMENTING SHELFSPACE: FIBRESHELF TECHNOLOGY**

While shoppers are in the decision stage of their buying behavior, customer-product interactions take place. Decker *et al.* (2003) distinguish three main 'shelf events': (1) Take – 'Item A taken from position (x, y), (2) Return – 'Item A returned to position (x, y), and (3) Remove – 'Item A removed from position (x, y)'. The latter connects the interaction context with the output event (i.e., purchase, registered at the checkout).

By integrating optical fibres into the bottom of a shelf, a rich set of shelf events can be sensed, without having to instrument the products. FiberShelf is designed to image the contents of a shelf at sufficient resolution to detect advanced shelf-level events. The FibreShelf consists of a standard shelf board equipped with optical fibres. The bottom of the shelf is perforated and studded with fiber optics, which are bundled together and interfaced to a normal web camera. After recalibrating the camera image with standard techniques from computer vision (CV), a reconstructed camera image of the objects standing on the shelf can be obtained. From this image, we are able to detect the position, form, color, motion and events relating to the items on the shelf, again by applying techniques from CV. In Figure 1, the red optical fibers indicate where light is channeled to the camera. The two darker fibers indicate where the object is occluding the light from entering the fibers. The resulting pattern of light observed by the camera allows the system to detect the attributes (e.g., position, form, color, motion, etc.). For more technical details please refer to Jackson *et al.* (2009). A related 'FoodBoard' solution to deal with unpackaged ingredient identification (e.g., during food preparation) has moreover been developed by Pham *et al.* (2013). The prototype (as shown in Figure 1b) was installed

into the Innovative Retail Lab in St. Wendel, Germany (Spassova *et al.*, 2009). The IRL is an application-related research lab at the German Research Centre for Artificial Intelligence (DFKI), located in the GLOBUS SB-Warenhaus Holding in St. Wendel, Germany. The close association with the experts of GLOBUS enables individual projects to have the focus on the specific needs and potentials of future self-service stores and accelerates the transfer of research results into practice.

(a) (b)

**Figure 1.** (a) The principle functioning of the FibreShelf (Jackson *et al.*, 2009); (b) The FibreShelf prototype installed in the IRL, Germany (Spassova *et al.*, 2009)

The technology's integration into customer's interactions is done unobtrusively to prevent distortions of the buying process. This is a main advantage over the use of video systems, which are very common in many retail stores as anti-theft support systems, for example. Video images could also be used to capture customer-product interactions, but the gathering and analysis of these data is more costly, less reliable and more time-consuming as human interpretation is often still needed, preventing real time information processing and response generation. Besides video systems, a second alternative technology to peek into the black box of retailing would be to instrument all individual products with unique identification methods. All sensors measuring interaction would have to be placed on the item itself (i.e. 'Smart Items'), rather than on the shelf infrastructure. The products could communicate wireless, providing a lot of details (e.g., which side shows to the potential buyer, number of rotations of the product by the customer, etc.). Related applications are often RFID-based (Wong and McFarlane, 2006), such as the Smart Shelf (Decker *et al.*, 2003). The main disadvantage of this approach relate to costs and power supply. FibreShelf technology benefits from the best of both worlds.

## APPLICATIONS AND RESEARCH AGENDA

The FibreShelf can report on three main customer-product interaction shelf events (i.e., take, return, remove) to a backend system. On top of these actions, certain applications can be built in order to (1) optimize shelf space management, (2) transform shelf event data into relevant shopper marketing information, and (3) develop shopper marketing actions at the point-of-sale. This section provides research propositions that should be put to a formal empirical test in order to further advance our knowledge on interactive shelfspace's instrumentation of the servicescape.

### Optimizing shelf space management

The FibreShelf registers in real time for each position on the shelf whether there is still a product located or not. Sending this information to a backend system, consisting of a plan-o-gram stating which type of product is expected at each shelf position, moreover allows for the identification of misplaced products. The integrated application could generate alert messages for both out-of-stock events as well as for misplacement events, contributing to the further optimization of automated shelf space management. Related to this application, we propose a formal empirical test regarding this hypothesis, addressing the following research question:

**RP1:** *Can the FibreShelf application significantly reduce (a) out-of-stock events and (b) misplacement events, in comparison to traditional, human shelf management systems?*

Finding support for this expectation would inspire further research on an economic cost-benefit study considering the quantification of both the benefits of reducing out-of-stock and misplacement events and weighing this gain against the cost of investing in FibreShelf instrumented infrastructure. Furthermore, a moderator- or sensitivity analysis is warranted to provide information on boundary conditions (e.g., the utility may differ depending on the retail setting's usage intensity of shelf space).

**RP2:** *Is the FibreShelf an appropriate marketing investment, considering a profound cost-benefit analysis? Are there differences according to the specific retail setting?*

### Gaining shopper insights

As discussed above, the FiberShelf application allows for research on the shopper along his/her path-to-purchase. These instrumented shelves are capable of registering what SKU a shopper takes first

from the shelf, and on whether he/she puts the product back, in order to potentially take a competing brand in the same product category. Such real time registration of shopper behavior at the point-of-sale allows both retailers and manufacturers to get an insight into what brands from the consumers' consideration set are evaluated by physically taking them from the shelf, to interact and read for example what the product packaging mentions, to what brand is ultimately chosen and taken from the shelf, into the shoppers basket or shopping cart.

In comparison to the wealth of scanner data that retailers can already rely on, additionally equipping the shelves with optical fibre technology, would provide access to a whole new type of data on the shopper's 'process', rather than on the outcomes of what has effectively been purchased as evidenced by scanning data from the checkout desk. It allows bricks-and-mortar retailers to deploy metrics similar to those used by online players (e.g., time-on-page; click-to-buy ratio). The click-to-buy ratio would – based on FibreShelf data – be obtained by addressing the gap in the number of 'takes' and the number of 'removes' (i.e., actual purchases). Moreover, the three shelf events can also be used as additional input for data mining and business intelligence systems. For example, the return on investment of an implemented POS-advertising campaign can be assessed quantitatively.

**RP3:** *How does the availability of FibreShelf shopper insights such as (a) customer-product interaction time, (b) take/remove ratio, (c) brand switching impact the return on marketing investments?*

### **Targeting shoppers on the path-to-purchase**

'Mobile marketing is becoming increasingly important in retailing. Due to the time-sensitive and location-sensitive nature of the mobile medium and devices, mobile marketing has the potential to change the paradigm of retailing.' (Shankar *et al.*, 2010: 111)

Location-based advertising (LBA) has gained considerable academic attention the past decade (Shankar and Balasubramanian, 2009). Usually LBA is used to target customers with personalized messages on their smartphone (e.g., providing an incentive to enter the store or to buy a particular brand). The main disadvantage of LBA is its intrusiveness and privacy issues that come along. Even though smartphone penetration is ever higher, not all customers are in to opting in for receiving LBA messages. Consequently, part of the potential target audience is still unattainable at the point-of-sale.

The FibreShelf application allows for a more direct interaction with customers, on a subtle level, without the need of supporting personal mobile phones. In particular, upon transmitting customer-product interactions to a backend system, an immediate response action can be triggered, such as communicating an ad hoc customized message on the electronic price label display of the shelf. As in Amazon's 'Customers who bought'-system, the FibreShelf allows retailers to formulate (cross-selling) suggestions to the customer, based on real-time registered product interactions (Decker *et al.*, 2003).

**RP4:** *Can real time FibreShelf information facilitate one-to-one customized, mobile communication with the shopper at the POS?*

**RP5:** *Can real time FibreShelf information increase cross-selling opportunities and customer satisfaction?*

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## 184. KEY CONCEPTS IN SERVICE INNOVATION RESEARCH - ACTORS, RESOURCES AND INSTITUTIONS

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### INTRODUCTION

Research on service innovation has become most relevant since we have entered a service-driven economy in which service innovations are important in shaping business creation and growth (Edvardsson et al. 2013). Thus, there is a need to focus on service innovation; both in companies and in academic research and not least to develop a more solid conceptual basis grounded in the logic of service (Ostrom et al., 2010). However, previous research on service innovation has used a goods logic and mainly viewed services as individual market offerings different from goods. We view recombination of resources as a central mode of innovation. Arthur (2009) even suggests that the emergence of all innovations actually can be understood through a combinatorial evolution

Many companies as well as nations are in urgent need of innovations that can transform their business or even the society. Businesses as well as governments and public service providers need to continuously innovate to stay competitive. Thus understanding and managing innovation is attracting much attention both in research and practice. But this is not easy! To predict future success is a challenge and has always been: “I think there is a world market for maybe five computers.” — Thomas Watson, chairman of IBM, 1943. “Radio has no future” — William Thomson. “Heavier-than-air flying machines are impossible. X-rays will prove to be a hoax.” — Lord Kelvin, British scientist, 1899. “There is not the slightest indication that nuclear energy will ever be obtainable.” — Albert Einstein, 1932. “If I had asked people what they wanted, they would have said faster horses” - Henry Ford. “If I had thought about it, I wouldn’t have done the experiment. The literature was full of examples that said you can’t do this.” — Spencer Silver on the work that led to the unique 3-M “Post-It” Notepads.

perspective. There is a need for identifying key concepts forming the basis for a theoretical platform for service innovation research.

This paper addresses suggests three key concepts; Actors, Resources and Institutions. We use the emerging theoretical lens service-dominant (S-D) logic as our view on service. In S-D logic, goods and services are understood as offerings or resources enabling value co-creation (Vargo and Lusch, 2004; 2008; 2011). As a consequence, the distinction between goods and services becomes irrelevant. Products and services are understood as resources with potential value, which has major implications for how to conceptualize service innovation. In our view, innovations are created within a service system and it is the service system, here referred to as a configuration of resources and actors embedded in an institutional context that enables innovation to be carried out in practice. Hence, without a service system innovation is impossible. S-D logic has recently been introduced as a research stream in the synthesis perspective of service innovation to further emphasize the reconfiguration of actors, resources and institutions, as well as a systemic nature of innovation. From this perspective, value co-creation is carried out by *actors* using their knowledge, skills, motivation as well as other available *resources*. The focus is on using resources with a specific intention or outcome in mind. It is about verbs and thus value is becoming when actors operate on and use a specific resource configuration. Since actors are not only economic actors but also social actors, social forces embedded in *institutions* such as norms and rules enable and constrain value co-creation. To become sustainable, the novel and useful resource configuration must result in satisfying value in use for the involved actors. The aim of this paper is to provide a conceptualization of service innovation built on three key concepts: *actors, resources and institutions*. Previous research has identified reconfiguration as a key innovation mode (see e.g. Gallouj and Weinsten 1997; Windahl et al. 2004), but has only elaborated on it as one of several alternative ways to understand innovation. Our Actor, Resource and Institution framework (*ARI-framework*) transcends previous perspectives and thus contribute to a more generic understanding of service innovation.

## THEORETICAL FRAMEWORK

In the literature on service innovation, three main perspectives are often put forward, assimilation, demarcation and synthesis (Coombs & Miles, 1995). Assimilation refers to service innovation from product innovation point of view (Chen et al., 2009). Demarcation refers to service innovation as something different from product innovation and being specific for the service sector and service organization. Research on service innovation often treats service(s) as a special category of products, or as “what goods are not” (Michel et al., 2008; Vargo and Lusch, 2006). The third perspective, synthesis, attempts to build a unified framework based on service innovation characteristics applicable to both manufacturing and service companies. The ‘synthesis’ perspective on service innovation brings neglected elements of innovation forward that are of relevance for manufacturing as well as services (Coombs and Miles, 1995; Drejer, 2004). This view on service innovation is integrative in the sense that both technological and non-technological forms of innovations are equally important (see e.g. Gallouj, 2002).

### A synthesis perspective on service innovation

Gallouj and Weinstein (1997) identify six modes of innovation: radical innovation, improvement innovation, incremental innovation, ad-hoc innovation, recombinative innovation, and formalization innovation. While several of these modes are similar to traditional models of innovations, we especially focus on the recombinative mode of innovation. Recombinative innovations are limited to changes in the service or technical characteristics. Independent of the perspectives and moods of innovation the ARI framework offer an extension. By using the key concepts, actors, resources and institutions, the framework is conceptualized in accordance with an S-D logic lens. Service innovation conceptualization will be based on the concept of configuration or reconfiguration that constitutes the dynamic process of value co-creation within the service system. The reconfiguration is founded in the integration of actors’ agency, resources and institutions. It is through the combination, incorporation and application of each of these three elements that service innovation are created. The reconfiguration is driven by actors and their actions are being directed and shaped by forces in institution such as rules (norms, directions and standards).

Akaka and Chandler (2011) argue that customers are increasingly taking on new social roles in ‘co-production’ and ‘value co-creation’ processes by designing and assembling firm offerings with companies such as Dell or IKEA (Normann, 2001; Prahalad and Ramaswamy, 2002). Many service innovations seems to be based on value co-creation through social interactions among multiple stakeholders within value networks, or dynamic, evolving systems of interconnected value co-creation such as Skype, Instagram and Facebook or dating websites. These can be examples of platforms, eco-systems or value networks; all within the context of institutionalized practices. These examples point to social roles, or a particular set of practices that connect one actor to one or more actors as a way of shedding light on the changing nature of interactions in service eco-systems.

Lusch (2012) describe a service ecosystem as “a spontaneously sensing and responding spatial and temporal structure of largely loosely coupled value proposing social and economic actors interacting through institutions and technology, to: (1) co-produce service offerings, (2) exchange service offerings and (3) co-create value. The service ecosystem concept views actors as making value propositions to each other versus delivering or adding value. It also puts emphasis on the co-production and co-creation that occurs between actors in the service ecosystem and hence has a strong focus on collaborative processes.

In our Actor, Resource and Institution (ARI) based framework the factors are intertwined and must be understood ‘in action’ as it is carried out in practice, which is in line with Schumpeter’s feature of innovation. Business innovations are about something being novel and useful in a specific practice, that creates economic (and other category of values) value for the involved actors. Actors – who can be an individual customer (or customers in groups), employees (or an individual employee) or a company (or organization) - are thus key in realizing innovations since they operate on or integrate resources with the aim to co-create value for themselves. Although, it has to be explicit stated that innovation does not be beneficial to every involved actors but for business innovations at least one actor must benefit from economic/financial value.

## **Actor**

The actor is the engine in every value creation and thus service innovation. The actor uses and operates on all understandable and available configurations of resources. Through their action the actors' reinforce the institutions when they configure and reconfigure the resources. Actors assess value from their own point of view in their given context. Actors possess dynamic resources such as knowledge, skills and motivation and the use of these resources are moderated by their enacted role as well as their institutions which have an impact on what is meaningful (signification), possible to achieve (power or domination) and what is understood as being legitimate (legitimation) (see Giddens, 1974; Edvardsson et al 2011). Actors also integrate and operate on available resources outside their direct possession but configured in a service system (Vargo and Lusch 2008; Spohrer et al 2007). Resource integration refers to the incorporation and application of a customer's resources within an organization's resources (Moeller, 2008).

## **Resources**

Resources have been described in many different ways such as having inbuilt value expressed in terms of attributes functions or features. This is now referred to as a goods—dominant view on resources. The service-dominant logic view refers to resources as having potential value but resources and their value are becoming or realized during value co-creation processes. Resources are thus understood as becoming in a specific situation, that is when used by actors, resources are integrated and enable (or constrain/ inhibit) value co-creation. This dynamic view on resources has long been recognized in the literature. Zimmermann (1951) pointed out more than sixty years ago that resources *are not*; rather, they *become*. More recently, Pels et al. (2009, p. 328) have characterized a social and economic process, and resources as...marketing as “ ‘becoming’, not ‘being’ ” and Ng (2013) emphasized this view and puts forward that resources must be useable for the involved actors.

## **Institutions**

Institutions shape how resources are becoming and used by regulating and shaping actors' resource integration and value co-creation efforts. To understand the forces shaping resource integration we need to identify and include the institutional rules that create forces shaping actors and social agents (Archer 1982, 2000). In this paper institutions are understood, as North (1990: 70) describes them: “a set of rules governing interpersonal governance”. Furthermore, institutions are understood to be constitutes of cognitive, normative and regulative rules. Institutions enable and constrain resource integration and value co-creation in service systems. Service systems and their logics are shaped by social values and forces in social systems (Edvardsson et al, 2011).

## **REFLECTION AND FURTHER DEVELOPMENT OF THE SERVICE INNOVATION FRAMEWORK**

This paper provides a conceptual framework for service innovation research built on three interdependent theoretical pillars; actors, resources and institutions. Service is understood as the outcome of actors' value creating efforts in which available resources are integrated and used within institutionalized norms and rules shaping and shaped by service systems. Value is assessed on the basis of value in use in specific practices. Service innovation refers to novel ways of co-creating value, enabled by e.g. new forms of collaboration, resource integration mechanisms, co-creation processes or ways to capture business value which are attractive and preferred by the involved beneficiaries. Some innovations creates new markets and result in major institutional changes while less radical innovations are created mainly within existing social and service system structures.

The integration of actor-resource-institutions is forming the basis for reconfiguring service systems in practise that may result in service innovations. In our framework, actors are granted the key role, since they make resources become and realize the potential of innovations. Thus, institutional logics are crucial in conceptualizing service innovation. This has not explicitly been brought into the discussion of service innovation and what enables and inhibits innovation through an S-D logic lens. *We understand service innovation as a change in value co-creation processes manifested in practice based on changes related to actors, resources or institutions.* We focus on what actors do and how – Acting, what resources are integrated and used by actors – Using and the institutional norms and rules

that either enables or inhibit actors when acting enabled by using resources in specific contexts with a specific value creation intention in mind.

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## 202. DELIGHTING SERVICE INNOVATION

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**Purpose:** Due to increasing levels of domestic and global competition, no company can succeed with merely satisfied customers who are not necessarily loyal nor committed (Voss et al., 2008). Therefore organizations have aimed to achieve customer delight to ensure customer loyalty and secure their competitive position (Oliver et al., 1997). Particularly innovative services have great potential to surprise customers or to exceed customer expectations and consequently produce delighting customer experiences (Bartl et al., 2013). However, research has not paid attention to the nature of delighting service innovations. Accordingly this research attempts to gain a better understanding of service innovations that evoke customer delight.

**Methodology:** We use the Critical Incident Technique (CIT) as an approved method in both service and customer delight research (Gremler, 2004; Bitner et al., 1990) to collect a variety of delighting service innovations and to analyze the drivers across industries and target groups (n=50). Additionally we conduct an exploratory qualitative study based on 20 in-depth interviews with customers to gain a

more detailed understanding of the individual drivers and their relevance. This study captures personal and situational factors as well as consequences more precisely.

**Findings:** We identify dimensions with sub-dimensions (e.g. first-mover-idea, peer-group-status) for the delighting service innovation construct and its effects (e.g. extraordinary positive W-O-M, need-to-convince-others). Moreover we classify the delighting service innovations by industries and target groups.

**Originality:** The current literature appears to have neglected the role of service innovations (Hauser et al., 2006) and especially their potential to delight. Our research adds new knowledge to the present body of service literature by providing a definition and delimitation of delighting service innovations. It explores the nature of delighting service innovations and explains how to create service innovations that delight customers as well as their customer-related and economic success-related effects.

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### **243. IMPROVING HEALTH INFORMATION SYSTEMS BY EMPLOYING A SERVICE DESIGN PERSPECTIVE**

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**Purpose:** Health information systems (HIS) offer great promise. However, the true benefits of HIS are elusive and there is evidence HIS can damage healthcare provision. Authors have pointed out that poor user and organizational involvement during the development of such systems results in their unfulfilled potential. Following calls for increased user involvement and multidisciplinary research in HIS, we introduce a service perspective for HIS development, meaning that healthcare professionals become active co-creators of HIS value. We worked with developers to improve HIS, adapting them to healthcare professional's experience requirements.

**Design/Methodology/ Approach:** Twenty-seven physicians and ten nurses from four different primary care practices and a hospital were interviewed, following a qualitative approach. Interviews averaged 43 minutes and were transcribed literally and coded using NVivo8 software.

**Findings:** Four main categories of experience requirements emerged from the interviews: IT system performance, clinical information, relationship with the patient, and organizational performance. Design guidelines were also posited: (1) Design for information, clinical information should be readily available, easily introducible and reachable in the detail required for each task; (2) Design for performance: HIS should be considered critical systems with high reliability and fast response times. Fragmented eco-systems of applications should be avoided, as they damage both information access and overall organizational performance.

**Practical Implications:** The understanding of healthcare professionals experience requirements and the offered guidelines instruct HIS developers on how to improve their systems. Improved HIS mean better, more accessible, and less costly healthcare provision, which can ultimately save lives.

**Originality:** HIS are known for lagging behind other industries regarding customer and user involvement, with damaging results in healthcare provision. By applying a service design perspective and service design methods we offer new ways to reverse this situation and structurally improve HIS development.

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## 275. REVISITING USER-BASED SERVICE INNOVATION- WHEN, WHOM, HOW TO ENGAGE USERS?

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**Purpose:** This paper explores previous literature to find out the current state of research in service development literature that addresses the engagement of users in innovation.

**Design/methodology/approach:** An extensive literature review was undertaken, with search words such as “customer involvement, service development, co-creation, service innovation”. Literature acknowledging the role of the customer was included in the final analysis, and a number of themes were identified that reveal the aspects that need to be taken into account when involving users in service innovation.

**Findings:** The results revealed several conflicting conclusions drawn in previous literature. For example, the original idea of involving lead users (von Hippel, 1986) has been questioned, as other user groups have been found equally or even more useful for innovation (Kristensson et al. 2008). Regarding when to involve the users, research has emphasized early and late phases of service development (Alam, 2006; Gruner and Homburg, 2000). Furthermore, user involvement also takes place outside the formal service innovation processes, as front-line employees often receive important information in daily activities (Alam, 2006).

**Research limitations/implications:** Given that the conclusions are based on previous literature, further empirical research is required.

**Practical implications:** The findings offer a number of practical tools and advise for firms regarding when, whom, and how users can be engaged. In particular, a broad view of previous findings enable managers to make more informed decisions regarding the involvement of users in service innovation.

**Originality/value:** The findings of the literature review a) summarize current knowledge of engaging users in service innovation, and b) reveal a number of unanswered questions in previous research regarding involving users in service innovation.

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## **279. EMOTIONAL STRATEGIZING IN SERVICE INNOVATION MANAGEMENT**

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### **INTRODUCTION**

In literature about service innovation and innovation management there is practically no discussion about emotions. Creating service innovations are described as a rational and cognitive-functional process where having a clear innovation strategy is a key to successfully manage innovation (Oke, 2002; 2007). Consider, however, what actually happens in the organization when new innovations are created; innovations induce changes in the organization. The innovation process and activities mean that some parts and persons in the organization are involved in trying to change current practices, structures and offerings. This might contain feelings of joy, enthusiasm, and hope for some, although for other it may potentially raise anxiety, concerns, fear, and anger.

In line with Langley et al. (1995), we argue in this paper that the mainstream perspective on development and service innovation processes so far, appears dehumanized in the sense that innovation work has been divorced from human emotions. However, reason and emotion are not independent; both are involved in decisions and activities performed during the service innovation process. As noted by Zaltman (1997), these are intertwined forces underlying decision making and action. Still, and just recently, it has been recognized that innovations can be highly emotional processes and that the role of emotion on managers' innovation decisions has so far been unexplored (Klauckien, Sheperd and Patzelt, 2013), and in management research, Liu and Maitlis (2013:1) argue that emotion is "an important but largely unexplored issue" in strategizing processes.

As a first step to create more knowledge in this important area, we investigate in this paper how emotions influence strategizing in service innovation management. We draw on extensive ethnographic material covering strategic practices during the innovation process of a technology based financial service. This paper argues for a micro perspective on emotions in service innovation practice. More specifically we are calling for an emphasis "on the detailed processes and practices which constitute the day-to-day activities of organizational life *and* which relate to strategic outcomes" (Johnson, Melin and Whittington, 2003:3) such as new services.

### **THEORETICAL FRAMEWORK**

Traditionally, strategy has been recognized as something the organization have or is in possession of; describing the company's strategic intent portraying and considering macro conditions and positions. As a result strategy literature is mainly focusing on macro level of competitors and markets, thus reducing strategy to casually related items, in which there is few signs of human action (e.g. Bettis 1991; Whittington 2003). To better understand strategy formation we also need to understand strategy at the micro level and how it is handled in practice, that is, to include the actions and interactions by human agency. By using this approach [Johnson, Melin, and Whittington \(2003\)](#) argue that human actors shape activities that are consequential for strategic outcomes. Furthermore, they reason for the 'doing of strategy' or what they call strategizing. Based on these arguments strategy has to, in addition to the macro level, be explored at a micro level and thus be understood in a social context. Strategizing comprises those actions, interactions and negotiations of multiple actors and the situated practice that they draw upon in accomplishing that activity ([Jarzabkowski, 2005](#)).



As part of the macro level focus it has been argued that the cognitive perspective on strategy is biased toward rationality and logic. Furthermore, Klaukien et al., (2013) state that “existing work has neglected the impact of individual characteristics on managers’ innovation decisions. Specifically, the role of affect in shaping these decisions has been unexplored so far”. Therefore, attention needs to shift away from the purely “mental” and the purely rational” (Johnson, 2009) towards the inclusion of affective and emotional issues. Hence, more knowledge is needed about strategizing and emotion from the perspective of the individual service innovation project manager.

Droege, Hildebrand and Heras-Forcada (2009) argue that little scientific knowledge has been acquired concerning the innovation process inherent in the development of new services. This has resulted in the fact that “current theory and understanding of the strategies and tactics for developing new services is inadequate” (Menor and Roth, 2007:825). A central characteristic of innovation management is managers’ decision making in the new service development process (cf. Klaukien, et al., 2013). Sundbo (1997:436) argues that service innovations are decided upon and formulated within the framework of a firm’s strategy. He claims that “all innovations must be kept within the strategy to prevent firm’s activities from becoming uncontrolled. The top managers of the firm control the innovation process, but ideas for innovations come from all parts of the organisation and from the external network of the firm”. Innovation strategy is, thus, separated from its implementation and ‘doings’. It is viewed as a top-down process of first formulation or intent and then implementation. Consequently, it is the top management that makes the decisions on service innovation and the top management is also responsible for making sure that the innovations are inside the strategy framework (Sundbo, 1997). Based on this Klaukien et al. (2013) argue that “an important goal in innovation management research is to understand managers’

To a limited extent, emotion has been investigated in the innovation context. For example, Wood and Moreau (2006) investigated the role of emotions from the perspective of consumers and how emotions influence their adoption of technologically complex products. From a managerial point of view, Akgun, Keskin and Byrne (2009) investigated emotional capability at the firm level and Klaukien et al. (2013) focused on how the emotion of passion influences managers’ decisions to exploit new product opportunities.

To summarize, “current theory and understanding of the strategies and tactics for developing new services is inadequate” (Menor and Roth, 2007:825), and as noted by Klaukien et al. (2013, referring to product innovation management), we argue that existing research on *service* innovation management has neglected the role of emotion in shaping innovation work and strategies. Moreover, researchers have called for people to be “put back” into the innovation process (Brenton and Levin, 2012). The strategizing perspective that we use emphasizes the human being and seems particularly suitable in service innovation management as it broadens the strategic agency beyond top management to include those middle managers often involved in service innovation work.

## METHOD

To investigate the role of emotions in strategizing activities, we draw on extensive ethnographic material related to the incremental development of a bank’s website. This material covers 54 observed development meetings, numerous informal discussions and insider documents. The ethnographic approach facilitates detailed understanding of the nitty-gritty of organisational processes. The approach is particularly suitable in studying strategizing as it captures not only sayings and intentions, but even more so the actual doings, which strategizing include and emphasize (cf. Balogun, Huff and Johnson, 2003). As argued by Mintzberg (1979), we believe that in order to study emotions and strategizing researchers need to go into the field, into the “flesh-and-blood processes” of organizations.

We focus on strategizing and emotion primarily from the perspective of the individual service innovation project manager. Thus, although others are also involved in the innovation team and process, the project manager is the key informant and the main strategist responsible for the strategic direction.

## FINDINGS

Throughout the innovation process period of 13 months many tactics were performed and strategies were made. We found distinct links between emotions expressed in innovation meetings/ethnographic

informal discussions and different kinds of strategizing. For example, the strategizing could take the form of developing new innovation plans and policies or the recruitment of ‘the right people’ to the innovation team and reference group. Interestingly, in our case we found that the main emotional driver of strategizing was the negative emotion of *anxiety*.

In the following text, we describe examples of the displayed and expressed anxiety that was observed throughout the entire process and show how this ‘emotional dynamic’ (Liu and Maitlis, 2013) triggered and influenced various forms of strategizing during the innovation process.

The main strategist is the project team leader. He feels that managing the innovation process is sort of a mission impossible:

I have a hard time finding motivation, because I realize...I know that this is a suicidal mission and I am not really passionate about it [the innovation], because I know there will be a lot of fuss and jabber, pure project anxiety I call it, get someone else to do it I say, but then again it is not that easy...so that’s how it is, and this is the project leader’s miserable fate, especially in our organization, which culture perhaps not always could be characterized as very professional but more as a sort of a prattle and jabber culture

The “prattle and jabber culture” or “the opinion machine” is referred to continuously throughout the process. These expressions denote potential opinions on the development of the new website that are assumed to come from other organizational members inside the bank, but outside the project team. The concern and anxiety about what the rest of the organizational member potentially will think and request shape a number of strategic activities performed during the innovation process.

Recruiting the ‘right’ people to the project team is considered a crucial tactic to make sure the assumed opinions will be “maneuvered” in a proper way. In one of the recruitment discussions the project leader motivates his preference for Mr X (name omitted) to be part of the project team:

If Mr X is *not* in [as a project member], then we’re really in a bad situation, because he really knows the organization, he knows who the informal stakeholders are, that, is the opinion machine; those people who should not have anything to say, but still do, and therefore it is really good to have him onboard to steer and maneuver that a bit

Another way of managing the perceived risk with ‘the opinion machine’ is to recruit a formal reference group as part of the project organization. This group is not given any decision making power, but functions as a feedback channel between the various units/departments it represents and the project team.

In a meeting between the project manager and the project board another form of strategizing is revealed:

Yesterday I told branch office directors that I expect and hope that they would send me their top three wishes about what they feel is most important related to the new website that we are developing.

The idea with this internal survey is to signaling and communicate that the project team is listening to others in the organization. As the project manager states: “there is a point to cajole the branch office directors, make sure that they continuously are updated on what’s going on in our project”.

Related to informing and communicating as a form of strategizing, the following discussion emerges in a meeting:

The project manager: “...and then a risk I think everyone knows about now is the potential internal opinions about the new website”

Mr X: “And here, we need to think carefully about how we inform, communicate, and if it comes a lot of questions, requests and opinions, then I think we just need to have some thought-out explanations and then they will calm down”

The project manager: “Yes, definitely and, yes, here I think the best way is if you and I sat down and discuss how to make the best strategy because there are many benefits to win, but there are some traps as well”

Mr X: “yes, and I see some that I think are more sensitive than others, some units or departments”

The project manager: “true”

Interestingly, the distinct emotion of anxiety seemed to permeate the entire innovation process; from the beginning until the launch. Two more strategizing activities that we identified will be briefly presented. The first one is the rhetorical mantra of “phase one” and the second is “the internal launch”. To manage the internal expectations on the new service, the team decided to repeatedly and rhetorically inform others that the current and entire innovation process is to be viewed as the initial development phase, as a phase number one. Thus, this mantra is orally communicated, it is put in print in formal insider documents; e.g. in “the revised project plan” and it is also put on the digital bulletin board in the bank’s intranet. The idea is to clearly inform others that “in this project we develop basics, nothing extra” and that this innovation process is to be regarded as a start. The main reason to this was expectation management. To make sure that the internal expectations on the new service would not be too high. It was also a way to make sure that the assumed reactions would not be too emotional in a negative sense. As expressed by the project manager: “because psychologically people do not want to get a NO for an answer, but if they get ‘yes, but in phase two or three, then we can put it in there’ [develop the specific issue asked for], then it feels better, it feels better for everyone. I will most likely repeat this so many times that I’ll tear it [the saying] apart before the end of this project”.

As a last example of strategizing stemming from a feeling of concern and anxiety is the internal launch. In a meeting between the project manager and the project board the launch date is discussed and it is decided that the new website first will be launched internally. “Because then this project address the typical critique put forward so many times before that the personnel do not know what is happening in our organization until it is externally known” (the project board manager).

## DISCUSSION

In this paper we investigated the role of emotions in service innovation management. Our analysis reveals that emotions influence strategists-at-work. Moreover, emotions can be the main trigger of both strategic activities and tactics. We identify anxiety as the main emotional dynamic underlying a variety of strategizing forms. Subsequently, anxiety decreased the degree of novelty of the originally intended outcome. Thus, our findings show that emotions, such as anxiety, have an impact on service innovation; its processes and outcomes.

We acknowledge that emotions can influence strategic activities or tactical practices in both direct and indirect ways. The unique contribution of our study, however, is to show a link between displayed/expressed emotion and actual strategic tactics performed. Therefore we establish the link between micro and macro level practices (see e.g. Jarzabkowski, Balogun and Seidl, 2007).

Our contribution to research on service innovation management is two-folded:

First, the research perspective on service innovation management so far has neglected the role of human emotion. As Langley et al. (1995) note related to literature on decision making, we argue that service innovation literature has dealt with innovation work as “driven by rational - albeit bounded - minds stripped of affect, insight and history” (Ibid., 1995:260). Hence, by exclusively focusing on emotion in everyday innovation work through the strategizing lens, our study introduces human activity and emotion into service innovation management research. Interestingly, it is well-known that cognition and emotion cannot be separated. Still, this ‘other ingredient’ in human and managerial activities is still much neglected in literature on service innovation management.

Second, innovation strategy is primarily viewed as a top-down process of formulation and intent separated from implementation (Sundbo, 1997). However, this type of approach fails “to deal with individual experiences of agency, in which *who* a person is, is innately connected to how that person acts

and the consequences of that action” (Jarzabkowski, Balogun and Seidl, 2007:12). Thus, by using the strategizing lens our study brings new insight on how innovation strategy takes place in practice, as ‘doings’ (Johnson, Melin and Whittington, 2003). This perspective emphasizes the human being and seems particularly suitable in service innovation management as it broadens the strategic agency beyond top management to include those middle managers often involved in innovation work (cf. Tuominen and Toivonen, 2011). Consequently, there is a need for more research in this area using this perspective.

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### **301. CUSTOMER IDENTIFICATION OF SERVICE INNOVATIONS BASED ON EVERYDAY INNOVATION EXPERIENCES**

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**Purpose:** Service innovation studies have focused extensively on characterizing service innovations from the organizational perspective (Ordanini and Parsuraman, 2011). There has been, however, minimal research on the customer perspective, specifically customer experience, of service innovations. The purpose of this paper is to investigate the ways in which customers identify offerings to be service innovations based on their everyday experiences.

**Methodology:** The research methodology involves questionnaire surveys of more than 300 respondents in Finland, India, Sweden and USA. The questionnaire included both quantitative and qualitative open-ended questions on customer everyday experiences of service innovations.

**Findings:** The study finds out that customers identify offerings to be service innovations based on their everyday life contexts. When offerings are experienced as not creating value for customers in their everyday lives, they are recognized as existing offerings and not service innovations. Apart from customer value creation, scalability of offerings is a determining factor in identifying service innovations.

**Research Implications:** The study contributes towards developing an alternate conceptualization of service innovations which is based on everyday customer experiences. This follows the contours of both SDL (Vargo and Lusch, 2008; 2004) and customer dominant logic (Heinonen et al., 2010) which argue for experiential determination of value. This study also contributes to the synthesis approach (Sundbo and Toivonen, 2011) of researching service innovation by examining it as a customer experience, independent of the product versus services dichotomy.

**Practical Implications:** Service managers are encouraged to study customer everyday experiences for sourcing service innovation ideas. Also, labeling offerings as innovations should be based on customer value instead of firm based considerations.

**Originality:** This is one of the few studies which investigate customer perspective on service innovation, going beyond researching innovation ‘for’ customers, to investigating innovation ‘as’ customers’ everyday experienced phenomenon.

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### 313. NEW SERVICE DEVELOPMENT PROCESS: A PAIRED COUNTRY INVESTIGATION

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**Purpose:** The aim of this paper is to investigate and compare the new service development (NSD) process between service firms in Greece and Kuwait. Moreover, potential differences are explored in the responses among the various service firms relative to their main type of service innovation they have developed within the three last years.

**Design/methodology:** The data presented in this paper are part of a broader study relative to the exploration of the NSD process both in Greece and Kuwait. For the case of Greece a total of 940 service firms were drawn and for Kuwait a total of 512 respectively. Firms were randomly selected by a sampling procedure that stratified among the different industry groups (for example: telecommunications, retail, banking, insurance etc.). A total of 196 complete structured questionnaires were returned concerning the service industry in Greece and 108 for the case of Kuwait.

**Findings (mandatory):** Data analysis revealed that there are major differences concerning the NSD process between service firms in Greece and Kuwait. Differences have been found when comparing the types of new services that have been developed during the last 3 years (Johnston et al., 2000), the degree of participation of the various firm’s departments within a NSD process, the illustration of the NSD stages (Lievens et al., 1999; Alam & Perry, 2002) and the sources of idea generation for a NSD project.

**Originality/value:** The originality of this paper lies in the fact that there is no prior study that examines the new service development process between a European country and a Middle Eastern one. Fruitful insights are drawn for the NSD process *per se* as well as for the main types of new services have been developed by the various services firms between the two industries.

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## 314. SERVICE DESIGN FOR THE HERITAGE EXPERIENCE IN ARCHAEOLOGY

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**Purpose:** The purpose of this presentation is to discuss the application of service design methodology for the creation of heritage experiences in Archaeology, looking in particular at harnessing the power of co-creation for user centered experience design in community-centric cultural tourism.

**Approach:** Co-creation is a central aspect of a holistic service design approach and proposes to treat all stakeholders as co-creators. It offers the opportunity to engage a host community as well as a visitor community in the heritage experience and its creation.

**Findings:** Post-modernism proposes that knowledge is socially constructed and if we consider this to be an important insight, we may concur that knowledge construction in the heritage experience should be inclusive and socially accessible. Archaeology is an area of practice where the notion of socially constructed knowledge is examined within the discipline, but does not always translate into how archaeological knowledge and artifacts are presented to the public or cultural tourism's host communities. Artifacts and fact may potentially be presented as static knowledge without the context the knowledge was created in being examined or opened up for discussion. This limits opportunity for audience engagement and for stakeholder inclusion in the construction and communication of that knowledge and thus how the Archaeological heritage is experienced.

**Value:** This paper will be looking at how service design can help create archaeological heritage experiences that explore a multi-layered narrative through co-creation and democratised strategies of engagement. Silverman (2002) noted that "archaeological tourism provides the opportunity for selective re-creation and reconstruction of the past", but in today's interconnected age this does not sound like a strategy fit for the 21<sup>st</sup> century.

The aim of the paper is to discuss the overall relevance of service-design to a heritage experience design in archaeology and how it may offer the potential to engage new audiences in archaeological heritage through stakeholder inclusion.

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## 333. USERS IN SERVICE INNOVATION – INDUCING CREATIVITY

Jon Engström and Elisabeth Johansson.

### INTRODUCTION

In this article I examine some of the underlying mechanisms of consumer ideation in service innovation. Companies increasingly see consumer creativity as an asset in the ideation phase of innovation and development of services and products in a outside-in rather than inside-out approach to innovation (Day, 1994). There is much to gain from this as consumers represent a vast variety of personalities with different backgrounds and knowledge, and have different experiences and emotions in relation to a given service or product. "Empathic design", "Lead users method", "customer driven

innovation”, “conversational approach”, and TRIZ are all examples of different methods for consumer ideation (see Kristensson et al., 2008). A successful example of consumer ideation is the development of Volvo SUV model, XC90 where a group of professionally successful and independent Californian women were invited to give ideas on the features of the car during the project (Dahlsten, 2004). The XC90 won “North American Truck of the Year” 2003, thanks to its ability to combine traditional SUV qualities with aesthetic and practical needs of luxury brand consumers (Volvo Cars, 2003) and the model has been a tremendous financial hit for the company.

While a large variety of different approaches to engage consumers’ creativity have been developed, ranging from complaint boxes to focus groups, there is still much to learn regarding mechanisms for consumer creativity in ideation and how we can induce consumer creativity. In this article I study some of the processes involved in consumer ideation. Primarily, I will study the effects of abstract versus concrete thinking on creativity. As I am concerned by creativity in innovation specifically, I define creativity from a service innovation perspective, where creativity is based on three different dimensions: originality, value and realizability (Kristensson et al. 2004). Furthermore, I examine how a state of creative flow functions as a mediator for this the creativity. From the seminal works of Csikszentmihalyi (1997) and following research, we have learned much of the tight relationship that exist between flow to creativity. In relation to flow, I propose that the presence of constraints in the creative process (Moreau and Dahl 2005) and a positive mood (Schwarz and Clore, 1983) will positively re-enforce the effect of abstract thinking on originality. This ties together important constructs in creativity research and enhances our understanding of consumer creativity.

The study has several important differences to previous research and adds to the literature in several ways. First, the by using multidimensional measure of creativity, the study allows us to understand on a more fine grained level how different conditions will influence the ideas of the consumers. Second, this is the first experimental study to clarify the mediating role flow plays in the relation between abstract thinking and creativity. Third, since this is a face valid examination of the effects of abstract versus concrete thinking in product and service innovation, the study does not only make a theoretical contribution, but also exemplifies how theory can be used in practice to induce customer creativity - especially in relation to the diary based method used for data collection in the study. The findings of this study can be used in the design of different consumer ideation efforts to promote creativity, but also into steering consumers into the type of innovation that is needed; there are different requirements for ideation whether the goal is to achieve radical and disruptive innovation or if it is to achieve incremental improvements.

## **THEORETICAL FRAMEWORK**

### **Creative Ideas**

Amabile et al. (1996) define creativity in broad terms as the production of novel and useful ideas in any domain. A creative idea thus consists of at least two dimensions: usefulness and novelty or originality. It is not enough for an idea to be original; it also has to be useful to be creative. In this article I use the three-dimensional construct that Kristensson et al. (2004) proposes for use on creativity in relation to innovation specifically. This construct consists of originality as one dimension, and two dimensions that together represent usefulness: value (for the consumer) and realizability (whether it is realistic that the idea could be implemented). Fulfilling one or two of these dimensions is generally easy (popcorn with fish taste is both original and realizable, but the value is questionable). Truly creative ideas that can lead to break-through innovations score high on all three of these dimensions. For some applications of consumer ideation however, we might prefer to use techniques that reduce originality in favor of realizable ideas that still have high customer value.

### **The Effect of Abstract versus Concrete Thinking on Creativity**

Construal level theory (CLT; Liberman and Trope, 1998; Trope and Liberman, 2010) suggests that a person’s perceived psychological distance to an event alters the responses to this event as the representation of this event changes. The larger the psychological distance, the more abstract the representations of these events will be. In the first article on CLT, Liberman and Trope (1998) examine the effects of temporal distance on decision making. They show that when we think about



situations in near-time, we think about these in more concrete terms, low construal, than we do regarding distant events, that we tend to think of in terms of end states, or goals. For instance, thinking about a vacation this coming weekend, we think about it in terms of practicalities regarding how we will go through with it, such as packing our clothes, but when we think about a vacation that we will enjoy a year from now we think about it in terms of the benefits, such as experiencing the world and spending quality time with our loved ones.

Consequent work suggests that there are more dimensions of psychological distance besides temporal distance: spatial distance, social distance and hypotheticality (Trope et al., 2007). Long distance levels in these dimensions have in common that they create representations that are more abstract and high-level than are their corresponding short distance alternatives. Our predictions and behavioral intentions regarding events are increasingly based on abstract rather than concrete features when the psychological distance to these events increase. Thinking abstractly, we are more prone to think in terms of purpose, “why” we do things, rather than “how” we do things (Trope et al., 2007). Studies show that psychological distance and creativity are linked. Individuals who experience long temporal or spatial distance to a problem are better problem solvers than individuals who experience short temporal or spatial distance (Förster et al., 2004; Liberman et al., 2012). Förster et al. (2004) provide two major findings in their experimental studies with relevance to this study. First, participants who imagined themselves in the future solved problems more easily and more creatively than those solving issues in present situations. Second, abstract thinking is not optimal for all tasks. While abstract thinking is useful in most creative tasks (such as redecorating one’s living room), it is not necessarily advantageous in solving more mundane tasks (such as fixing the curtain hanger), the authors suggest. Abstract mental representation can in fact impede analytical reasoning which demands concrete, low-level processing (Förster et al. 2004). While Förster et al. (2004) use creativity as a unidimensional measure (either by the ability to solve a problem or measured as judged by experts), we are here interested in understanding how these phenomena affect the three different dimensions of creativity in relation to innovation. Based on findings regarding psychological distance and creativity, I hypothesize that:

*H1a. Long psychological distance will yield more original ideas versus short psychological distance.*

I also hypothesize that psychological distance will positively affect value. As the consumer leaves the mundane and focuses on high-level issues, problems and opportunities on a system level with large impact on customer value.

*H1b. Long psychological distance will yield ideas with higher customer value versus short psychological distance.*

However, as at the same time as these ideas may have a high customer value, they may be hard to realize. Higher-level construal will focus attention to “why” things should be done rather than “how” that can happen, why I hypothesize that:

*H1c. Long psychological distance will yield less realizable ideas versus short psychological distance.*

### **A state of inspiration – the mediating effect of Flow**

Theory of flow (Csikszentmihalyi, 2008) adds an important piece of theory to creativity research. Csikszentmihalyi describes flow as a mental state in which a person performing an activity is energized, focused and enjoys the process of the activity. Creative work and flow are tightly linked (Csikszentmihalyi, 1997). For instance, studies on how artists perform their most creative work shows that there is a tight link between creativity and flow (Csikszentmihalyi 1971). The phenomenon has been reported in a range of settings, from rock music to chess to surgery (Csikszentmihalyi, 1997). Flow happens when a person has to use his or her skills, meaning it is neither too difficult nor too easy, for a task that seems important, according to Csikszentmihalyi. Perhaps because of its intuitive nature - everybody has experienced flow, scholars who study flow agree on the conceptual definition of flow offered by Csikszentmihalyi. However, a review by Hoffman & Novak (2009) shows that despite this unity, a consistent operational definition of flow is lacking. There is also no clear cut definition of how flow in creative work and flow in general (for instance in sports). There are, however, reasons to believe that there is a connection between creative flow and psychological distance. The work of Novak et al. (1998) demonstrates that playfulness is a central component to Flow and relates to skill, challenge, and exploratory behavior. As we have a larger psychological

distance to the event, we can allow ourselves to be more playful and creative and less concerned of whether our outcomes are viable or not. A creative flow also seems to depend on abstract thinking directly. As Csikszentmihalyi writes regarding how ideas emerge during creative flow: “[creative insight will come up when] ...a subconscious connection between ideas fits so well that it is forced to pop up into awareness...” (p. 104, Csikszentmihalyi, 1997). This reasoning leads me to the following conclusions:

*Hypothesis 2: The effects of abstract thinking on originality and value are mediated through a state of creative flow.*

### **Thinking inside the box**

Creativity requires us to focus use our mental capabilities. This idea relates to the work by Moreau and Dahl (Dahl and Moreau, 2007; Moreau and Dahl, 2005) who show that constraints can increase creativity. This finding is interesting, as many techniques for consumer ideation build on lowest possible constraint, such as brainstorming or focus groups. This low constraint could lead to an adoption of the path of least resistance, which affects flow and creativity negatively. Moreau and Dahl (2005) use two constraints in their study: a time constraint and a requirement to define inputs to creativity.

*H3. Constraints will moderate the effect of abstract thinking on originality and customer value. In particular, the presence of a constraint will have a positive effect on these.*

### **The Effect of mood**

A good mood is beneficial for creativity (Isen et al., 1987). Moods are relatively diffuse affective states that typically lack a particular object relation that stimulates an action-orientation, and we can generally divide mood into positive and negative states (Davis, 2009). In relation to consumer driven innovation, the effect of mood is interesting for two reasons. First, in many cases, a negative event is the starting point for customer involvement. Complaint boxes et cetera use negative events as starting point, which may result in a bad mood at the time of the complaint. While important, in that we better understand problems in our service, this may not be the best way to draw on consumer creativity. Second, some consumers may be in a longer state of bad mood. For instance, we can easily imagine that patients going through a rough time, may not be at their peak for innovation, and if we want to engage them in these activities, we may need to wait for a suitable time to do so. In a meta-analysis on mood and creativity, Davis (2009) shows that a positive mood positively influences creativity in ideation, while mood does not seem to have the same effect on problem solving tasks. Based on these findings that show that a positive mood influences creativity in ideation, but not so in creative problem solving, I suggest the following hypothesis:

*H4a. Mood will moderate the effect of abstract thinking on originality and customer value. In particular, a good mood will have a positive effect on these.*

*H4b. Mood will not moderate the effect of realizability.*

## **METHOD**

I will answer the over-arching research question, which concerns how we can understand the link between abstract thinking and ideation for service innovation, through the hypothesis I have put forward in the above. I will test these hypotheses through an experiment on service consumers in an online experiment.

### **Design**

I will ask users for a service will be to give ideas on how that service can be improved. In this case Facebook users will be asked to give ideas on how to improve Facebook’s services. I’ve chosen Facebook as the service in question since it’s well known service (Facebook currently has close to a billion registered users). I will base my method for data collection of consumer ideas on the diary based approach for consumer ideation (Elg et al., 2012; Kristensson et al., 2004), in which I will ask the participants to first write about an experience and then provide ideas. The experiment will be web-based. Details in instruction will be varied for different test groups. The experiment will have a 2 (construal: abstract vs. concrete; between subject) ×2 (mood: positive vs. negative; between subjects) ×2 (constraint: time constraint vs. no time constraint) design. Subjects will be 240 Facebook users,

and I will conduct the experiment through Amazon Mechanical Turk. The subjects will be randomly assigned to the different groups.

## CONCLUSIONS

If the hypothesis put forward in the study are valid, it allows us to draw some conclusions. Firstly, we need to take psychological mechanisms into account when design ideation techniques. An important lesson is that if we want to be creative, we need to be allowed to let loose of our inhibitions. If we design innovation involvement techniques to be abstract, hypothetical and fun, we will get more creative outcomes. We can learn from the makers of computer games – if we create a hypothetical situation in which the consumers can fully immerse themselves at the same time as we put constraints on the processes, so that the task doesn't become neither too easy nor too hard, we will achieve original and valuable ideas. On the other hand, if our goal is to find incremental improvements to existing solutions, we might want keep down the abstract thinking and ask participants to be concrete and specific.

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## **352. INTEGRATING FRONTSTAGE AND BACKSTAGE SERVICE DESIGN: AN HEALTH CARE APPLICATION TO THE BLOOD VALUE CONSTELLATION**

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**Purpose:** This paper contributes a better integration of service design models and tools used in service frontstage and service backstage. The paper presents an application to health care blood services, from blood donation to processing and transfusion, where the customer experience of both donors and patients is deeply influenced by the blood processing service operations at the backstage.

**Design/methodology/approach:** Following service design approach, the research followed iterative cycles of inspiration, ideation and reflection. As such the research started with a qualitative approach to understand the multiple actors' perspectives in the blood value constellation, involving 60 interviews with donors, blood receivers, blood service managers, doctors, nurses, staff and technicians. .

The ideation phase was supported by service blueprinting ([Bitner, Ostrom et al. 2008](#); Patrício, Fisk et al. 2008) and multilevel service design ([Patrício, Fisk et al. 2011](#)) methodologies, involving workshops with a group of service design researchers, healthcare IT developers and blood service experts.

**Findings:** This qualitative study enabled an in-depth understanding of the customer experience of the different actors of the blood value constellation, involving blood donors, patients, and the different health care professionals working in the service operations. Based on this understanding, the connections between frontstage and backstage service design decisions were also explored, integrating research from service design and service operations management.

**Research limitations/implications:** This study contributes a better interconnection between service design and service operations management, integrating the customer experience focus of service design with the process and performance focus of operations management.

**Practical implications:** This provides insights for integrating the design of the customer experience at the frontstage and of backstage service operations in the context of complex value networks with multiple actors. The study also contributes for understanding how frontstage and backstage design decisions are interconnected.

**Originality/value:** Service design has gained increased importance but the connection between design of the customer experience at the frontstage and design of backstage operations still needs further research. This paper contributes a better understanding of how these design decisions are interconnected, and an integration of the methods and tools from service design and service operations.

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## 359. OPTIMIZING SERVICE LEVELS IN THE GROCERY RETAIL SECTOR

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### INTRODUCTION

One of the basic strategic decisions a retailer must make involves the determination of the assortment to offer. Product assortment planning (PAP) involves important decisions related to the determination of variety (i.e., number of categories), depth (i.e., number of stock-keeping units within a category) and service level (i.e., amount of merchandise inventory within a category) in a retailer's product portfolio (Mantrala et al., 2009; Hübner and Kuhn, 2012). By making optimal PAP decisions, retailers hope to satisfy customers' needs by providing the right service in the right store at the right time (Nogales and Suarez, 2005). If the retailer fails to provide the expected assortment, customers defect, causing losses in both current and future sales. This paper attempts to correct for omissions of existing PAP research by introducing a new innovative method, namely Differential Evolution (DE). The proposed mechanism facilitates simultaneously, strategic PAP decisions, related to the determination of a) optimal variety of Private Label (PL) categories in a retail grocery store, b) optimal service level of PL merchandise within each category, and hence, c) optimal balance between PLs and national brands (NBs) in a retailer's product portfolio. The interrelated issue of assortment adaptation across different store formats is also considered.

### THEORETICAL BACKGROUND

Despite the longstanding recognition of the importance of PAP, several limitations and gaps can be found in existing PAP literature. First, existing research tends to examine analytical solutions that deal almost exclusively with questions of depth, whilst it completely fails to address issues related to variety and service levels (see for example, Mantrala et al., 2009). Second, current literature focuses on a single category or subcategory of products or services and fails

to examine the interplay among various categories that are offered by a retailer. Third, although in reality a retailer might have a different assortment at each store format, the academic literature has focused on determining a single assortment for a retailer, which could be viewed as either a common assortment to be carried at all stores or the solution to the PAP problem for a single store (Kök et al., 2006). Finally, PLs have been widely neglected in existing PAP literature, despite the fact that retailers consider PLs as a powerful competitive tool, which allows them to improve their service offering and store image, and hence, obtain greater margins and profits (Nogales and Suarez, 2005). The growing penetration of PLs in a number of product categories makes PAP decisions even more complicated.

We assume that a retailer carries  $m$  different categories (variety), within which, a merchandize inventory of both NBs and PLs may be carried (service levels). The optimal PL-PAP problem for the retailer is to decide, in terms of customer demand, on the optimal configuration of PL categories that must be carried (i.e., PL variety), and the optimal amount of PL merchandize inventory within each category (i.e., PL service level), as a percentage of the total merchandize carried in the given category.

A number of criteria to optimize can be selected, such as profit maximization, cost minimization etc. In this study, we choose to maximize the retailer's sales volume; however, our approach can be easily adapted to any other criterion. The optimization of the PL-PAP problem is based on consumer preferences for PL product categories. We assume that each customer has made his decision whether to buy PL or NB from a given category before visiting the retail store. The probability of purchase depends on the service levels (amount of merchandize inventories) that a retailer offers in a given category. For example, a customer who generally prefers PLs in the alcoholic beverages category, is more likely to buy alcoholic beverages from a particular retailer if this retailer has an extensive PL service level within this product category. Different approaches can be adopted for modeling the relationship between probability of purchase and service level within a category. Also, we assume that the amount of money a customer spends on a certain category is linearly proportional to the respective service level of that category. In particular, we assume that the monthly expenditure of a customer in a specific PL category of a given retailer, equals the amount of PL merchandize inventory (PL service level) offered in that category by the retailer times the total budget spent by the customer on that product category per month. In this manner, the optimal PL-PAP problem is formulated as follows:

$$\text{Find } pl_r \text{ and } b_r, \text{ for } r=1, \dots, m \text{ that} \\ \text{maximize } f = \sum_{c=1}^n \sum_{r=1}^m (pl_r * apl_{cr} + b_r * ab_{cr}) \quad (1)$$

$$\text{under } pl_r + b_r = 1 \quad \forall r$$

$$(2)$$

$$pl_r, b_r \in [0, 1] \quad (3)$$

where  $m$  is the number of categories carried by the retailer,  $n$  is the average number of customers visiting the retailer per month,  $pl_r$  and  $b_r$  are the percentages (service levels) of PLs and NBs, respectively, that the retailer carries in category  $r$ ,  $apl_{cr}$  and  $ab_{cr}$  are the total monthly expenditures that customer  $c$  spends on PLs and NBs, respectively, in category  $r$ . Since  $pl_r$  and  $b_r$  can take any real value in the range  $[0, 1]$ , the problem becomes very complex. For example, if we allow  $pl_r$  to take only 10 different values  $0, 0.1, \dots, 0.9$  (i.e., a 10% step), the number of possible solutions for a retailer that carries 10 different categories is  $10^{10}$ . In order to find a good approximation of the global optimal solution in tractable time, we introduce the Differential Evolution algorithm to the PL-PAP problem.

## METHOD

Differential Evolution (DE) is an evolutionary, population-based algorithm, for global optimization over continuous spaces. It was first introduced by Storn and Price (1997), and has been extensively applied to a wide domain of optimization problems due to its ability to efficiently handle non-differentiable, nonlinear and multimodal cost functions. DE's great popularity comes from its good convergence properties, as well as its parallelizability that enables the successful handling of computation intensive cost functions. DE is based on the Darwinian theory of Evolution (Engelbrecht, 2007): In a world with limited resources and stable populations, each individual competes with others for survival. The individuals with the best characteristics will more probably survive and reproduce. Those desirable characteristics (a) are passed on to their offspring, (b) are inherited by the subsequent generations, and (c) over time will become dominant among the population. During the production process of a child organism, random events may cause random changes to its characteristics. If these altered characteristics benefit the organism, then the likelihood of survival for the organism is increased. In accordance to this, DE works with a group (population) of candidate solutions to the problem (individuals). The algorithm searches for the global optimum through an iterative process. In each algorithm's iteration the individuals produce offspring through *crossover*, and some individual's characteristics are randomly altered through *mutation*. The strongest (fittest) individuals of the new population survive to the next generation.

### Initialization

DE begins with the random creation of a Number of Population individuals ( $NP$ ). Each individual  $i$  corresponds to a candidate solution of the problem, and is represented by a vector  $\vec{x}_i \in \mathfrak{R}^d : \vec{x}_i = (x_{i1}, x_{i2}, \dots, x_{id}), i = 1, 2, \dots, NP, x \in \mathfrak{R}$ , where  $d$  is the number of problem's dimensions. The individuals of the initial population are randomly created and usually follow a uniform probability distribution. The initial population should cover the entire range of parameter values, or at least the domain space that may contain the global optimum.

### Mutation

Once the initialization is completed, the mutation is applied, in contrast to other evolutionary algorithms which first apply crossover. The mutation operator of DE generates new vectors of individuals by adding the weighted difference between two *difference* vectors to a *base* vector. For each individual  $i$  (*target* vector  $x_i$ ) three vectors are randomly chosen from the population: a base vector  $x_b$ , and two *differentials*  $x_d, x_{d'}$ , ( $i \neq b \neq d \neq d'$ ). The *mutant* vector is then produced as follows:  $u_i = x_b + F * (x_d - x_{d'})$ , where the scale factor  $F$  is a positive real number in  $[0, 2]$  that controls the amplification of the differential variation, which in turn controls the rate at which the population evolves. In each algorithm's iteration (generation) every individual  $i$  serves once as the target vector.

### Crossover

The crossover process follows, which produces an offspring  $x_i'$  (*trial* vector) through implementing a discrete recombination of the target vector  $x_i$  and the newly produced mutant vector  $u_i$  (Price et al., 2005):

$$x'_{ij} = \begin{cases} u_{ij}, & \text{if } (\text{rand}_j(0, 1) \leq Cr \text{ or } j = j_{rand}) \\ x_{ij}, & \text{otherwise} \end{cases}$$

The crossover probability,  $Cr \in [0, 1]$ , is defined by the user, and controls the fraction of parameter values that are copied from the mutant. In uniform crossover the value of  $Cr$  is compared to a random generated number from a uniform distribution in  $(0, 1)$ . If the random

number is less than or equal to  $Cr$ , the trial parameter is copied from the mutant, otherwise the parameter is inherited from the target vector. Furthermore, the trial parameter with randomly selected index  $j_{rand}$  is taken from the mutant, in order to ensure that the trial vector does not duplicate the target vector.

### **Selection**

If the trial vector performs better than the target vector with regard to the problem's objective function, then the trial vector replaces the target vector in the population of the subsequent generation. Otherwise the target vector survives intact into the next generation. This constitutes the selection process of DE.

As Lampinen and Storn (2004) state, DE is self-adjusting because, in contrast to classical Evolutionary Strategies, it deduces the perturbation information from the distances between the vectors that comprise the population. This feature automatically yields reasonably large vector perturbations at the first phase of the optimization (exploratory stage). At the later stages, when the algorithm is approaching the optimum, the distances between the vectors automatically get smaller. These smaller perturbations allow DE to conduct a fine-grained search for the optimal solution.

### **Implementing DE to the PL-PAP Optimization Problem**

The proposed mechanism is implemented to empirical data that have been collected for the purposes of a large-scale telephone survey research examining consumer buying behaviour and preferences in the grocery market of a European metropolitan area. A highly structured questionnaire was developed and data were collected from a random sample of 1,928 supermarket customers. The telephone survey was conducted by the Computer Assisted Telephone Interviewing (CATI) facilities of a local university. Respondents, among others, were asked to state their average expenditure per supermarket visit, the number of supermarket visits per month, the supermarket store format they usually prefer for their main shopping, the amount of money they usually spend on PLs, and the PL categories they mostly prefer. In total we examined consumer preferences for a set of twelve product categories that are usually available in a typical supermarket.

Since the number of categories is  $m=12$ , we represent a potential solution  $i$  to the problem with a vector:  $\vec{x}_i = (x_{i1}, x_{i2}, \dots, x_{ir}, \dots, x_{i12})$ ,  $x \in [0, 1]$ , where  $x_{ir}$  is the percentage of PLs (PL service level) that the retailer carries in category  $r$  ( $pl_r$ ). The parameter  $x_{ir}$  is allowed to take any real value in the range  $[0, 1]$ , which corresponds to a 0-100% percentage range. The percentage of NBs (NB service level) in the same category ( $b_r$ ) is easily derived from constraint (2). The number of customers is  $n=1,928$ , and the monthly amount that customer  $c$  spends on PLs ( $apl_{cr}$ ) and NBs ( $ab_{cr}$ ) are known. Hence, we are looking for the optimal  $\vec{x}$  that maximizes the objective function (1).

### **Selection of DE Parameters**

We fine-tuned the parameters of DE to select the best configuration for the optimal PL-PAP problem. We tested eight different values for the *Population Size* ( $NP$ ), nine different values for the *maximum number of iterations* ( $t_{max}$ ), nine different values for the *Scaling Factor* ( $F$ ), and four different values for the *Crossover rate* ( $CR$ ). Table 1 illustrates the values for each of the four parameters in the  $8 \times 9 \times 9 \times 4$  full factorial design that was implemented.



Table 1: Parameters and Values used in Full Factorial Design Experiment

Parameters	Values								
Population Size ( $NP$ )	80	90	100	120	130	140	150	160	
Number of iterations ( $t_{max}$ )	50	60	70	80	90	100	110	120	130
Scaling Factor ( $F$ )	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7
Crossover rate ( $CR$ )	0.2		0.4		0.7			0.9	

Three replications were performed for each of the 2,592 combinations of the four parameters, resulting in a total of 7,776 runs of the algorithm. The results indicate that for more than 100 iterations, and for  $NP > 120$  there is no gain in performance, while the best performance was achieved for  $F=0.3$  and  $CR=0.9$ .

## RESULTS

We implement our DE algorithm to find optimal solutions (i.e., PL service level per category) in the entire data set and each of the three store-formats separately. The parameter values used are  $t_{max}=100$ ,  $NP=120$ ,  $F=0.3$ , and  $CR=0.9$ . Without loss of generality we assume that customers equally divide the PL monthly budget to each category. Table 2 illustrates the best solution (% of merchandize inventory allocated for PLs in each category) found in each case.

Table 2: Optimal PL Service Levels per Category\*

FF	PF	LP	HCP	PHP	DPP	NAB	DP	BP	CP	TC	AB
<i>Entire data set</i>											
0.4	47.29	7.18	6.71	1.48	82.83	5.2	4.62	10.76	1.78	6.12	3.94
<i>Large mainstream supermarket chains</i>											
2.23	68.2	7.75	2.49	0.5	83.94	0.49	6.11	2	0.82	1.37	0.3
<i>Discount supermarket chains</i>											
0.42	89.31	51.06	84.98	1.42	88.47	1.32	5.2	1.58	1.02	0.64	2.86
<i>Small local supermarket chains</i>											
0.7	6.75	6.46	4.02	2.98	3.39	0.27	0.05	0.23	1.63	0.88	2.58

\*FF: Frozen foods, PF: Packaged foods, LP: Laundry products (e.g., detergents), HCP: Household cleaning products, PHP: Personal hygiene products, DPP: Disposable paper products, NAB: Non-alcoholic beverages (e.g., soft drinks, juices, bottled water), DP: Dairy products, BP: Bakery products, CP: Clothing products, TC: Tea and coffee, AB: Alcoholic beverages (e.g., wines, beers).

The retailer can also decide on the threshold below which the introduction of PLs in a specific category is not desirable. This threshold may vary across retailers depending on the respective inventory and handling costs. If for example, a retailer sets this threshold to 5%, the derived optimal solution for the entire data set in Table 2 suggests that this retailer should mainly focus its efforts on providing extensive PL service levels in product categories such as disposable paper products and packaged foods, and also maintain a decent PL presence in categories such as bakery, laundry, household cleaning products, tea-coffee, and non-alcoholic beverages. The derived percentages are well below the threshold of 5% in categories such as frozen foods, personal hygiene products and clothing products; a finding which implies that the introduction of PLs in these categories would not be advisable. These results are also graphically depicted in Figure 1, which also outlines the optimal balance between PL and NB service levels per category, based on constraint (2).

Regarding the adaptation of PL service levels across store formats, interesting conclusions can be drawn from Table 2. For example, managers of large mainstream supermarket chains must offer extensive PL service levels in categories such as disposable paper products and packaged foods, whilst they should also maintain a decent PL presence in categories such as laundry and dairy products. In line with our expectations, discount retailers are expected to provide broader varieties of PLs, because in addition to the PL categories offered by mainstream supermarkets, discounters must also provide extensive PL service levels in

household cleaning products. Finally, the derived optimal percentages in most product categories of local supermarket chains are extremely low. This finding indicates that local grocery stores should concentrate their efforts in providing a narrow variety of PLs, by focusing on few categories, such as packaged food and laundry products. A cross-format comparison of the optimal PL service levels per category is graphically depicted in Figure 2. It can be seen that discount supermarkets not only must offer broader varieties of PLs, but also more extensive service levels within those varieties (the derived percentages are higher compared to the respective percentages of the other two store formats).

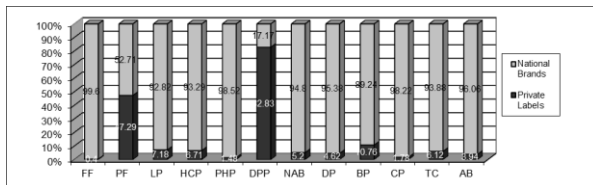


Figure 1: Optimal Balance Between PLs and NBs

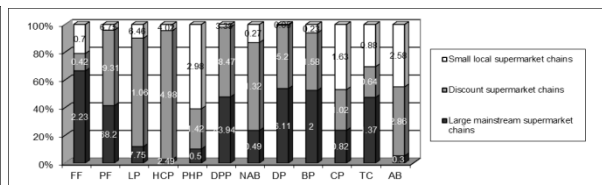


Figure 2: Optimal PL Service Levels across Store formats

## CONCLUSION

The present paper introduces evolutionary analysis to strategic assortment planning. We have shown how Differential Evolution algorithms can address assortment management problems and identify optimal PL varieties and service levels in a retailer's product portfolio. The interrelated issue of assortment adaptation across different retail store formats is also taken into consideration. Evolutionary notions such as selection and variation shed new light on retail and assortment management, as they can facilitate, in a unified framework, important decisions related to optimal variety of PL categories, optimal service level of PL merchandise within a category, and optimal balance between PLs and NBs in a retailer's product portfolio. We believe that evolutionary analysis can open new avenues and reveal exciting opportunities not merely for new research, but for novel, revolutionary views of market behavior. Differential evolution algorithms can be applied to several similar marketing problems such as advertising scheduling, service design and diversification, product line management and innovation. We hope that the ideas presented here will motivate research in new ways to view and innovative methods to address marketing problems.

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