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Introduction

The advent of the new millennium has witnessed an increasing skepticism about the powers of information technologies (IT) to create business value, leading to sluggish investment in new IT. Generating business value using IT is a challenge in this environment. A critical element in this environment is the necessity to create a satisfied and an empowered customer. This paper describes an emerging technology, choice-boards, that allows customers to design their own product and services. More specifically, choice-boards are interactive, online systems that permit individual customers to custom design their own products by choosing from a menu of attributes, components, prices and delivery options [8]. Dell provides a popular instance of choice-board at its site, Dell.com. It is an important part of the firm's web-based direct ordering system. Customers start with a basic configuration defined by a processor model and speed, and then go on to specify the full configuration of a personal computer with their choice of hard-drive size, memory, and add-ons such as CD-ROMs, multi-media, monitors and printers.

This paper provides a framework called choice-board pyramid that businesses can use to acquire competitive advantages in the market by successfully using the technology of choice-boards as a differentiating factor. The framework relates four factors: company strategy, consumer characteristics, systems and the service that is offered. The framework allows for defining two interrelated spaces:

- 1) The interaction between the consumer, the choice-board system and the resultant experience that the consumer encounters. This is the *experiential space*—the space of different kinds of experiences. It helps to answer the question, *How do you ensure a positive experience for the customer?*
- 2) Strategy helps select the customer segment to serve, which, in turn, helps to identify the choice-board service that the customer would most appreciate. Understanding the nature of *service space* – a space of customization possibilities –

helps in answering the question, *How do you select the appropriate customization for the customer?*

The remainder of the paper will focus on choice-board systems, our framework, the concept of experiential space and the concept of service space.

Understanding Choice-Boards

Choice-boards are becoming popular in a wide variety of industries. They are being used in industries as varied as toys, recruitment, finance, wireless phones, travel, apparel and telecommunication gear. While choice-boards are all designed to help users customize their choices, they do so using differing focuses such as providing product information, advising customers, and even letting users have a vicarious experience with the product they have customized.

On VermontTeddyBears.com, for example, children are offered many options from which they can select various add-ons to the teddy-bears, e.g. in terms of shoes, glasses, and color. At travel sites such as Travelocity.com, customers are provided with information for choosing not only their flights, but also hotels and rentals cars. Choice-boards systems are used in learning and training of individuals in which users make choices and are provided with feedback as to the consequences of their choices. Similar sites are available at GEFinancialLearning.com and in Cisco.com. The Cisco site employs a tool, Product Advisor, which assists users in network design and installation using Cisco products and solutions.

While choice-board systems such as Dell.com began with providing information to customers, some systems have graduated to providing advice as to the most appropriate choice to make. Point.com uses a choice-board system to help customers buy service plans and wireless phones based on their budget and service profile. Vicarious experience of the product is another option that these systems are beginning to embody. At landsend.com, customers spend a few minutes answering questions on

weight, height and body-shape. They can select colors, styles and pocket options for the apparel they desire to purchase. The system then generates a picture of the person wearing the apparel. The firm is gearing up its choice-board system to help customers order custom-made jeans in a few-months time, with slacks, shirts and swimsuits following thereafter. Similarly, at lanebryant.com, customers can generate 3-D models of themselves using a virtual model technology called [3D@LB](#), which can then be used for trying out, in a virtual sense, tops, jeans and career-wear available at the site.

Benefits of Choice-Boards

Choice-boards offer many advantages to customers and businesses. For businesses, the technology is becoming a significant mode for differentiation in the crowded market place [8]. In product markets, customers are product-takers, i.e. they are offered a fixed set of products from which they are constrained to choose. Customers are typically allowed some variation as to add-ons and features. Buying cars is a good example of a market where customers are product-takers. Choice-boards allow customers to migrate from being product-takers to becoming product-makers. They are able to interact with the system to precisely describe what they want so that suppliers can deliver the product with minimum delay. They cease to be passive recipients and become active designer; in other words, they are product-makers.

For businesses, choice-boards are becoming a source of accurate and real-time data on consumer preferences. Since the configurator records every customer's preferences, Dell, for example, is able to capture buying patterns in real time. The basis of decision-making at Dell moves away from speculating to actually knowing what the customer wants. The choice-board system allows the firm to manufacture against an actual order, vis-à-vis other PC suppliers who manufacture to forecasts, which are apt to be inaccurate. Dell has a pull-based system where customers "pull" their orders in contrast to other PC makers who have a push-based delivery system. In push-based systems, companies make the best guess as to what might appeal to their customers, and plan on delivering the merchandise months ahead of the actual sale to

its distributors and retailers. Forecasting is an inaccurate process leading to a huge inventory of goods that buyers often refuse to purchase. This leads to firms engaging in sales and offering rebates, dealer incentives and give-aways to get rid of unsold goods. The pull-based system has allowed Dell to integrate its production line with those of its suppliers. The cross-firm integration has shifted away from silos to a system where information in real time is collected and distributed across the process-chain, and services are delivered to customers in the shortest possible time [9].

Finally, the service model has now shifted from supplier-provided service to self-service. Customers make their own designs and express their customized choices without any other human intervention. Firms save on labor and in processing the entire transaction. Customers feel empowered and firms save on costs.

The Choice-board Pyramid

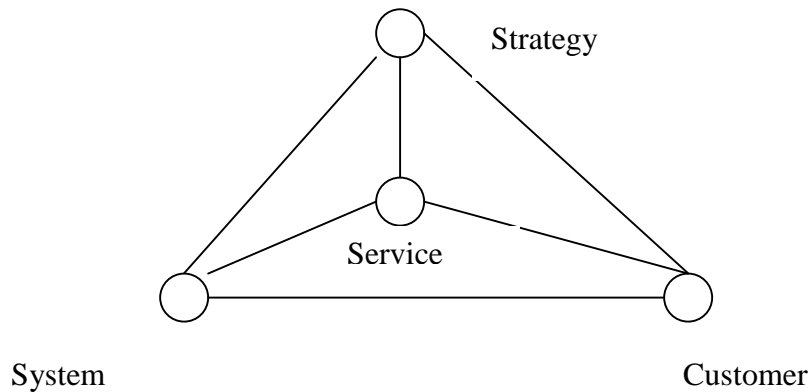


Figure 1: The Choice-Board Pyramid

The choice-board pyramid framework is related to Karl Albrecht's Service Triangle [1] and Parasuraman's Service Marketing Triangle [2]. It is composed of four factors 1. Strategy 2. Customers 3. Service 4. Systems (Figure 1):

Strategy. Strategy is a distinct formula for delivering a unique service that helps a firm differentiate itself in the market [5]. It is built around asking such basic business questions as: 1) In what business is the firm engaged in? 2) Am I selling PCs or am I selling business solutions that use computer software and hardware? 3) Am I selling apparel or am I trying to make my customers feel good about themselves in the context of dresses? The differentiation is achieved in the context of some particular customer segment.

Customers. A strategic conception in the context of choice-boards leads to questions such as: 1) Who are my customers? 2) How sophisticated are they in using computerized tools? 3) What are their needs, e.g. are they children buying toys using PCs from homes or are they engineering professionals considering networking gear using high-speed connection from their offices? 4) What makes them come to my business? 5) What makes them go to my competitors? 6) What value elements are important to my customer? The most important selection in strategy building is

deciding what markets to serve with what products. The first step in market selection is the division of the market according to some scheme that is relevant to the industry. A market segment is set of customers who are alike in the way they perceive and value a product. The segmentation can be done along several dimensions: demography (e.g. income, age, education, tastes and consumption pattern), geography (e.g. location and culture specificity), lifestyle (e.g. career-oriented women versus at-home moms) and product-use patterns.

Service. A strategic conception defines not only a market segment, but also the nature of service that needs to be delivered. The uniqueness and the differentiation power reside in providing a value element that the particular customer segment values highly and considers superior to that delivered by other firms. The service delivered by a choice-board is of self-service type and the benefits are intangible. The experience needs to be positive so that the firm stands from its competition.

Systems. The system delivers a particular service to a specific customer segment. The system consists of an information processing and manufacturing component that produces products customized for each customer. The discussion of this system is beyond the scope of this paper.

There are different combinations of elements of the pyramid framework that define relationships that are crucial for managers to understand. The *experiential space* – the space of possibilities of different kinds of choice-board experiences – is driven by strategic choice of market segment to serve and the manner in which the firm intends to differentiate itself from others. It leads us to the question: *How do you ensure a positive experience for the customer?*

Strategy assists in selecting the market segment to serve, which, in turn, helps to identify the choice-board service that the customer may most appreciate. The *service space* – a space of customization possibilities – is driven by the market segment and

leads to the question, *How do you select the appropriate customization for the customer?*

The next two sections focus on these two questions.

**The Experiential Space:
How do you ensure a positive experience for the Customer?**

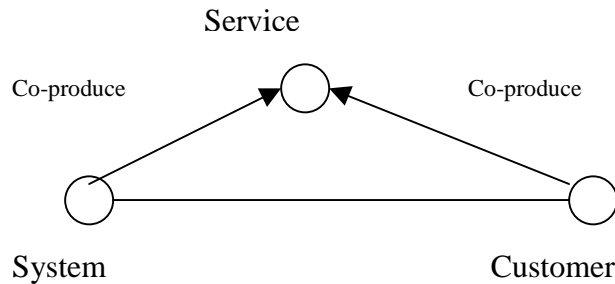


Figure 2: The Experiential Space

Three factors of the pyramid framework are examined here: customers, systems and services (Figure 2). The focus is on how customers and systems co-produce the service in choice-board systems. Executives need to understand how customers experience this self-service at choice-board sites [7]. Important elements of this experience are: its intangible aspects, the real-time aspects, self-service, and degree of system assistance [7].

Intangible Aspects

Physical goods are usually high in “search attributes” that a customer can determine before buying a product such as color, weight, reliability and maintainability. In contrast, services are heavy in experience attributes, which can be discerned only during consumption. For the choice-board experience, issues such as time taken, ease of finding relevant information and pleasant user-interface are relevant. Because services are inherently more difficult to evaluate, customers are often influenced by tangible aspects of the service system. The quality of web-site and its attributes are likely to be taken as surrogate measure of the quality of service provided. Designers

of choice-board systems should focus on web interface, its color, style, ease of navigation and functionality because they may play a major role on how the system is experienced.

Real-time Aspects

Services are delivered in real time and customers must be physically present to receive the service. The perceived quality of service is realized at the “moment of truth,” i.e. when the service provider and the customer encounter each other. The encounter may be dispersed over several instances spread over a period of time or it may all occur in a single instance. Customers are increasingly time-sensitive and time is an important dimension of service evaluations. Time to deliver the service via the choice-boards is an important attribute.

In choice-boards, the service production occurs in the presence of the customer and, as a result, errors made by the system cannot immediately be undone. There are no service people close at hand to guide the customer on how to use the system if it malfunctions or if the system is too complicated for the user. Firms employing choice-boards need to deploy a system that is always available, reliable and is easy to use even for novice users.

Self-Service:

In self-service, the customers do not directly confront any service provider, but instead operate some equipment to provide themselves with service. In many cases self-service provides more convenience. For instance choice-boards are available twenty-four hours a day and wherever there are interconnections, and the service delivery can be self-paced. However the shift to high-tech can be unpleasant to many customers who may not be computer-savvy. Customers who are not familiar with technologies may require training, continuous guidance, a user-friendly interface, and easy telephone access to employee who can answer questions. A sense of “high-touch” may be provided by the use of music and video snippets, inter-active capabilities, and software agents that mimic human behavior.

Degree of System Assistance

Choice-boards began with PC suppliers who provided a well-defined menu of choices. The role of the customer included providing the complete specifications for the products they wanted. However, in many purchase situations a customer is not competent enough to provide these specifications. The problem situation is sufficiently complex that the customer needs help to decide. In fact, this is a common occurrence in investment and engineering decision-making. The functionality of choice-boards has evolved and now they can undertake a new role – the advisory role. They have embedded in them decision support software that dispenses solutions that customers need. Similarly, for many products and services, customers need to experience a product or service in a vicarious or a virtual sense to be certain that it is what they want. This is a common situation for fashion items where choice-boards are now providing 3-D modeling tools and software.

In summary, the following guidelines need to be considered in order to ensure a successful experience for the customer:

- The choice-board experience is intangible and the web site experience in terms of use and feel often stands as a surrogate for the actual performance of the system. The system should be transparent and using the system should require minimal mental processing so that customers can fully focus on making their choices.
- The system is real-time and the user does not have access to immediate help in case of malfunction. The system should be designed for stability and reliability with all assistance through email and phone made available where possible.
- The system assistance provided to the customers should be in accordance with the type of service that is being ordered. Choice-boards could be purely informational as when ordering PCs or play an advisory in design situations or provide a virtual experience for fashion products.

**The Service Space:
How do you select the appropriate customization for the Customer?**

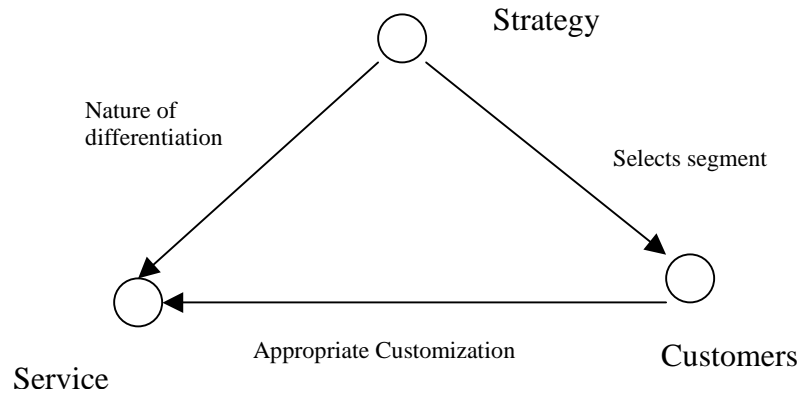


Figure 3: Influence of Factors on Customization

Customization, the key goal of choice-board systems, comes in several generic forms [3] that often mix and match these generic forms. The actual choice of customization is influenced by strategy, which decides on the nature of market differentiation that the firm wants to pursue, and the market segment to be served (Figure 3). No firm can be all things to all people. Strategy assists in selecting a core customer group to serve and in identifying and occupying a unique space in the customer's mind. In the world of choice-boards, identifying core customers is even more critical than in businesses that do not use them. With these systems, the firm is offering customization to its customers, with there being a physical limit on the variety in customization with which any firm can cope with.

The company has to take steps to identify its core customer group – it is usually the group that provides it with maximum margins, are most loyal, and provide highest lifetime value. The firm should provide customization according to the preference profile of this core group. Once, the core customer group is identified, it is necessary to determine the nature of customization that needs to be offered. Gilmore and Pine [4] advise four different forms of customization: 1. collaborative customization 2. adaptive customization 3. cosmetic customization 4. transparent customization.

Collaborative Customization

This is relevant to industries such as apparel, shoes, household goods such as furniture, and industrial products. For these products, customers experience difficulty in describing their ideal tradeoffs on comfort, functionality and price. Providing a representation that they can manipulate helps them to participate in the design stage by playing out and vicariously experiencing the possibilities that are available to them. Examples of these are Lands End products and kitchen design tools.

The customization approach can also be applied in other phases of the value-chain such as delivery. In collaborative delivery services customers can specify, for example, delivery location, the time of delivery, and package form. Web-based shopping services such as Peapod.com leads in this field.

Adaptive Customization:

This form of customization creates standardized goods and services that can then be tailored and modified by customers to suit their needs. This form of customization is suitable when the environment where the product will work offers an enormous set of possibilities and the technology exists that allows customers to customize the product design to suit specific environments. Complex products such as servers and software can be offered with standard design. Customers can begin with the standard offering and then customize it according to their specific needs. Peapod.com has adopted a similar form of customization that allows a customer to build up a shopping basket by storing their personal shopping list and then modifying it by looking through the list provided by them.

Cosmetic Customization

This is a special form of adaptive customization. It is a relevant form of customization when the basic product fulfills the needs of a large segment of customers, and only the presentation needs to be changed. An example is Vermont

Teddy Bears. Children can customize the appearance and the customization is built over a standard form of the toy.

Transparent Customization

This form of customization provides tailored goods and services to customers without them being necessarily aware of it. Web-based customization tools collect data and categorize customers into segments and then present their site in a manner that is transparent to the visitors. For example, Amazon.com provides a recommended list of books to customers that is derived from their buying habits. The lists are generated in a manner that is transparent to the visitor.

In summary, the following is a guideline for selection of appropriate customization.

- Products such as computers that allow discrete combination of features are well suited to adaptive customization. Choice-boards that are informational in nature may have adaptive customization as their basis.
- Fashion goods and apparels are more appropriate for adaptive customization. Choice-boards for these products should allow for 3-D modeling to promote vicarious experience on part of the customers.
- Sites that are visited often and thus allow customer profiles to be developed are suited to transparent customization. Software tools that allow customer segmentation on the basis of purchases and click-through behavior may be considered for adoption. Customized products can be offered to customers without their asking for it.
- Cosmetic customization should be considered for toys and furniture. These sites should also have 3-D modeling.

Conclusion

Choice-boards provide the foundation for a new business model that is characterized by a user selecting product and service features from a computerized menu of choices. Firms employing this technology are offering a new value – proposition in which the customer is empowered to become a product-maker instead of being a product-taker. Not only can customers implement their choices, but, depending on the application, can experience how that choice would work. Firms that do not offer these systems are at a competitive disadvantage.

This paper described choice-board systems and their diverse applications. It provided a framework that managers can use to target the technology to create business value. The framework has four elements: strategy, customer, service and systems. Taken three factors at a time, the framework generates two important spaces: the experiential space and the customization space.

Managers need to understand the nature of these two spaces and the various possibilities inherent in them. Such an understanding will aid in responding to the two questions discussed in this paper and which are critical to creating business value:

- How do you ensure a positive experience for the Customer?
- How do you select the appropriate customization for the Customer?

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