

Value Creation along a Production-Service Value Chain

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Abstract Today's products and services are so complicated and intertwined that their individual value creation is hard to determine. It is especially true when the products and services are necessary complements of each other and when they are affecting customer satisfaction for a long time. In the case of durable products needing professional installment service, the study of value creation poses many difficulties. Our research shows and emphasizes the process characteristic of value creation, and how the different steps (production, service, long-term use) should be looked at, and what further analyses can be done.

Keywords: customer value, value creation, value chain

Introduction

Today's companies are not simply competing with products or services. They offer a bundle of products and/or services offering value to customers, i.e., a value proposition [10]. This proposition has more attributes than a product or service individually can have, but the basis of the offered value will be the tangible products or the intangible services. The functionality will always be important; however, the value can have several different elements [1].

The value chain for home renovations – which forms the basis of the present research – works similarly. In the case of a general contractor, the buyer receives a complex value offer, a product-service package; other times, he or she searches for a service provider for a product, or a product is purchased after selecting the service provider. In any case, customers are experiencing a single, quite complex value creation.

In our research, we try to explore how value develops along such a value chain and what each player should focus on to maximize the provided value. Accordingly, the structure of the article is as follows. First, we review the value creation process, the value chain. Next, we examine the value creation process to see what management tools might be appropriate to examine each part (product, service, in use). Finally, we summarize the main findings and outline further research steps and directions.

1. Value creation and value chain

If we think in terms of value, we tend to tie it to the output. The value, however, can constantly change from the recognition of a need to the acquisition of a product, service, and during the use of the output. And sometimes even longer. That is why it is important to see value creation as a process, and not just from the company's point of view but from the customers' as well.

This process can be well outlined with the help of [2] buyer decision process, where there are five steps: Problem/Need Recognition, Information Search, Evaluation of Alternatives, Purchase Decision, and Post-Purchase Behaviour (Figure 1).

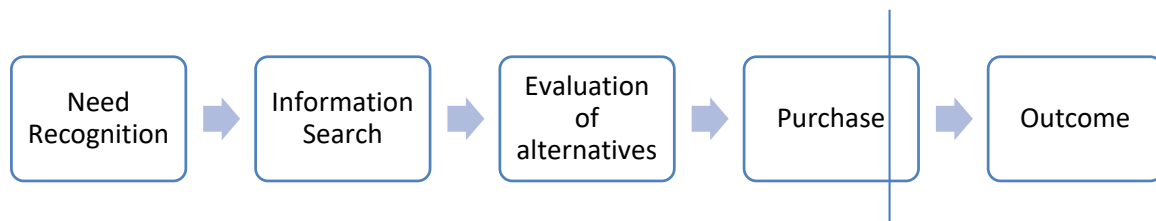


Figure 1: Model of consumer decision-making. Based on: [3]

In the buyer decision process, two quite different phases can be distinguished. In the first step, the need is recognized, and the decision-making process begins, the decision is made. From this point on, especially in the case of services, the outcome of the whole process is experienced, and the post-purchase phase begins. This phase is different from the earlier one as customers can get first-hand experience about the value in this phase.

In our research, we are focusing on durable goods. As durable goods, by definition, are consumer goods that have a long (over three years long) life span, they are used for a long time, so their consumption and the different experiences during this period have a determining impact on the whole experience as well. Namely, we examined the production-service value chain of a long-lasting construction product group, doors and windows. The elements of the previous sentence highlight that the examined value chain (Figure 2) has several features. The purchase of windows and doors (for example, for the purpose of renovation) entails the use of the professional service (installation) required for its use. To these two very different types (product and service) of value creation, the satisfaction or dissatisfaction from the long-term use of the product is added.

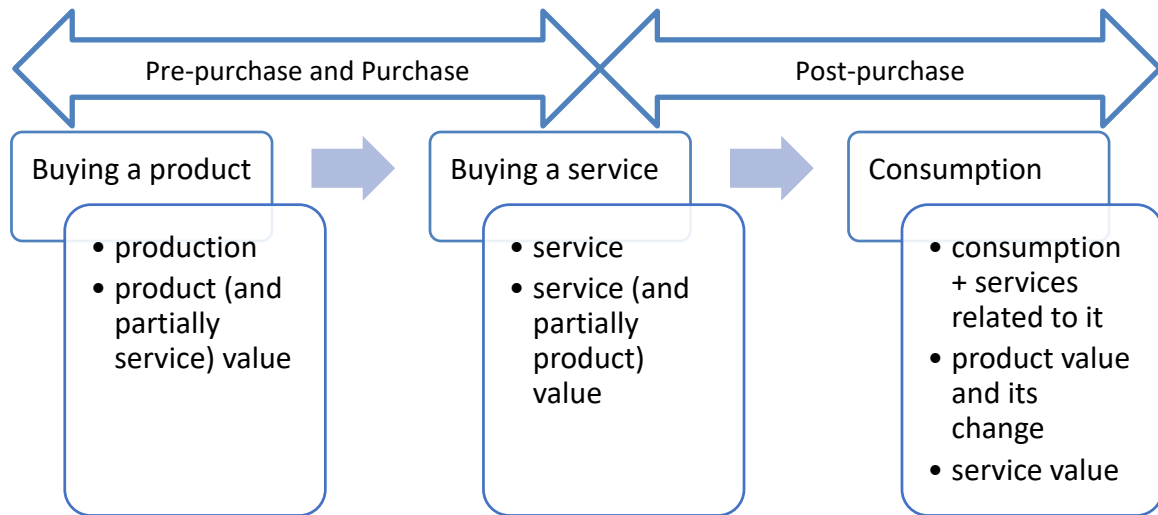


Figure 2. Consumer decision process and value chain

As products and services form the basis of the value chain, their respective value-creating capabilities have to be taken into consideration. These questions are traditionally both well researched in the academic circle and well supported in practice. During the long-term use of durable products, the product characteristics are in focus once again. This is when the different features and their levels can really be experienced. Additionally, the provided service can have long-lasting effects on the value, and additional products and services can enhance the value as well.

Because of this complex process of value creation and its possible changes over time, the whole process should be analyzed step by step. In the next chapter, we will follow the value creation along with these steps, highlight the most important management framework behind it and outline our research and research plans.

2. Theoretical background

Perceived (service) quality is defined as the difference between the expected (service) experience and the experienced (service) experience [5]. This perceived quality forms the basis of customer satisfaction and customer value.

Achieving the highest possible customer satisfaction and improving quality is a task to be implemented for all sectors, including the construction industry. To achieve higher recognition and better recommendations, organizations aim to build better, stronger, and longer relationships with their customers. To ensure the importance and measurability of customer satisfaction, it is important to define the value creation inherent in each step of the process [14].

2.1. Value from product

As can be seen in Figure 2, the first part of the examined value chain is related to the product. It can be the beginning step (if the product is chosen by the customer) or the second (in this case, usually, the

service provider has some role in choosing the product). In both cases, the most important factor in the decision and later in the value creation is the characteristics of the product.

Being a tangible product, the eight product dimensions of Garvin [4] should be taken as a basis for assessing and developing value. These are perceptions of performance, special features, reliability, compliance, durability, serviceability, aesthetics, and quality. The quality dimensions and their relation to customer satisfaction are outlined in Figure 3.

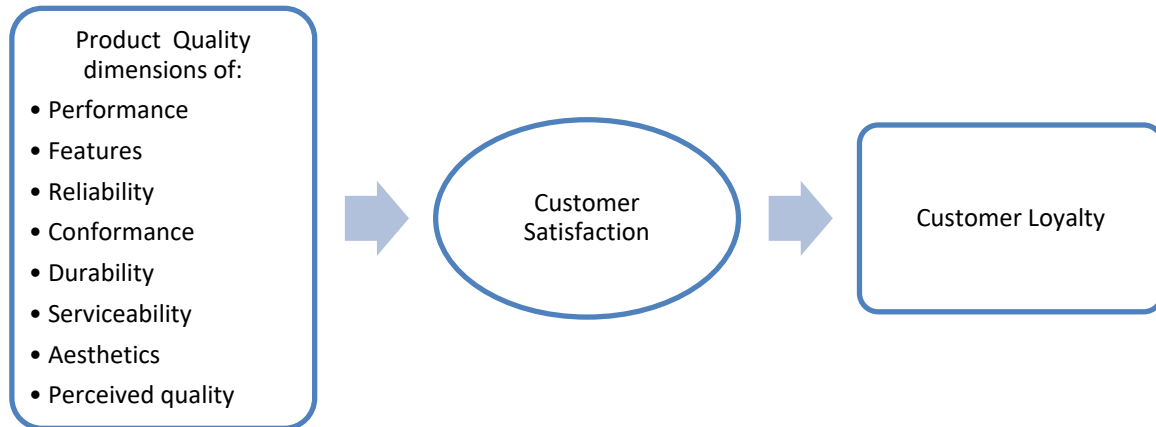


Figure 3. Product quality dimensions and customer satisfaction, loyalty Based on [7]

To analyze the level of these dimensions, most companies apply some measures. Based on our interviews with window manufacturing companies, we identified the quality dimensions as follows,

1. Performance: operational characteristic
2. Feature: Special properties: breathability, water tightness, wind resistance.
3. Reliability: The average time between two maintenances
4. Conformance: Compliance with installability, functional characteristics
5. Durability The life expectancy of major components
6. Serviceability: Number of available services, time of replacement of parts
7. Aesthetics: look, fit to the internal, external environment
8. Perceived quality: Quality perception of the brand's reputation in the window manufacturing industry, consumer evaluation

When manufacturers consider the quality dimensions interpreted for doors and windows, it is important for manufacturing companies to keep at least two perspectives in mind. On the one hand, the professional opinion of professionals is the basis on which their product can reach the end-user – either by recommending it to the direct end-user or by entering larger projects. On the other hand, end-users judge the experience of using primarily along these dimensions, so it is important to consider practical experience (without special expertise) as well.

2.2. Value from service

Another starting point of value creation can be the service. In this case, generally, the service provider recommends or purchases the product for the work. The value of services can be analyzed based on several management frameworks and tools (e.g., Parasurman's quality dimensions, 7P of marketing, SERVQUAL survey). Based on the service-profit chain [6], it is clear that service providers have to focus on increasing the quality of services to enhance service quality and customer satisfaction, i.e., increase service value.

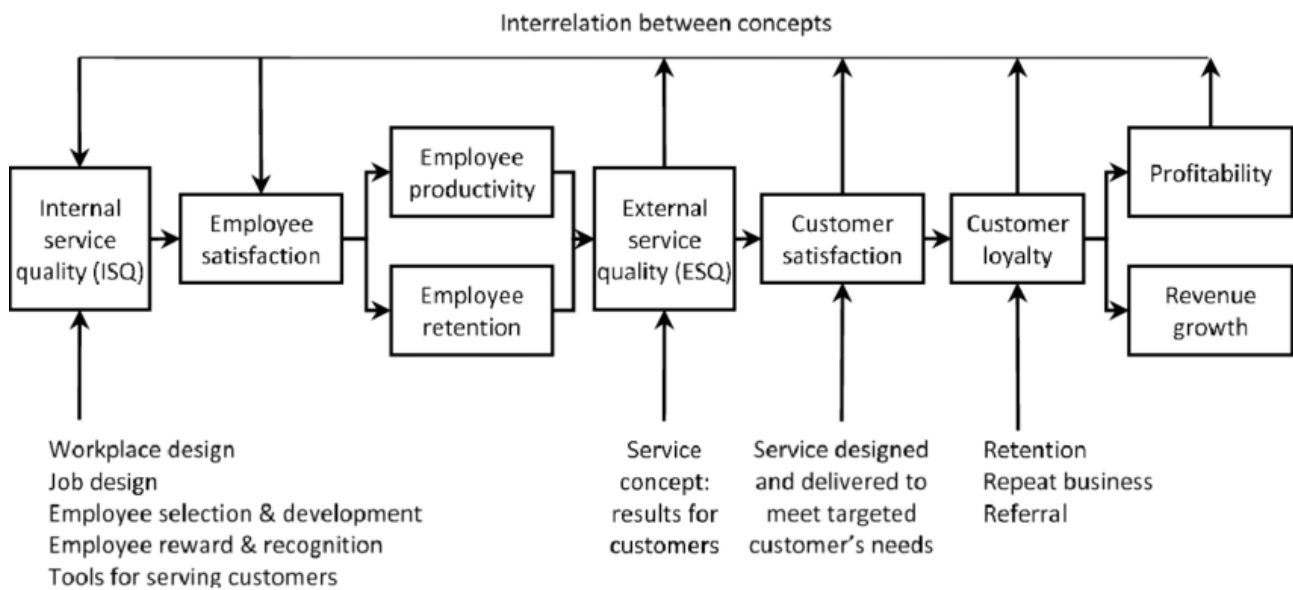


Figure 3. Service-profit chain [6]

To increase value creation, the most frequently used approach used by the providers is focusing on the main quality characteristics of services. According to Parasuraman et al. [12], these categories are reliability, adaptability, competence, accessibility, courtesy, communication, credibility, security, customer understanding, and tangible factors.

In the case of installation services of windows, the quality dimensions can be interpreted based on our studies as follows,

1. Reliability: Achieve customer trust through the installer's offer
2. Adaptability: The competence of the installer to provide the service
3. Competence: The skills and knowledge required for recommendation
4. Accessibility: Assistance in selecting the building material
5. Courtesy: The behavior and attentiveness of the installer
6. Communication: Useful information, language used
7. Credibility: The reputation of the company

8. Security: Physical, financial security
9. Buyer Understanding: Assessing customer needs
10. Tangible factors: The tools and equipment used to provide the service

The quality of service received goes far beyond the functional adequacy of the service (e.g., the quality dimensions), and the level of satisfaction is also influenced by a number of subjective factors (e.g., cognitive factors of perception and perception, emotional factors). In addition, the assessment of the provided service is also affected by the characteristics of the chosen (recommended) product as well.

2.3. Value from long-term use

The last part of our value chain is about using the product and the output of the service. (Further value creation is possible in the customers' transferrer role [11], i.e., when jobs related to the end of the lifecycle of a value proposition are performed, e.g., it is transferred or resold to others). In our research, the product is a durable good, meaning that this phase of value creation lasts for a long time.

During the long-term use of the results of home renovation, the conformity of the product and its usage characteristics are once again at the center of customer value. The customer has many years to learn about the performance of the product in key dimensions and even about their changes. Thus, during use, the customer does not have a one-off perception of the product; problems may also occur. In addition, the value from use can be increased by other activities (such as additional maintenance work).

The study of factors influencing customer satisfaction and value after the purchase and long-term use of products and services is addressed by several disciplines in different approaches:

- Marketing management places great emphasis on opportunities to reduce cognitive dissonance when examining post-purchase behavior [13]. It is important to highlight that in our value chain, customers consider at least two purchasing decisions: one for product and one for service.
- Changes in the quality characteristics of a product during its service life and the possibilities of influencing it are supported by quality management solutions based on von Neumann's reliability theory. The negative effects of failures due to the natural aging process of the products can be well compensated by appropriate preventive actions.
- During the actual use of the product, the dimensions of the use of the product belonging to the concept of ergonomic usability – safety, efficiency, comfort – can be examined [8]. Of course, these factors, like those in the previous examples, need to be considered at the product and service design stage, even if they are only actually experienced during use.

In the case of windows, one of the most important quality characteristics is related to reliability. Besides fault-free operation, customers expect windows to remain operational for a long time, even if maintenance and repair activities must be carried out. The deterioration of the product can be described according to the bathtub curve of hazards (as the opposite of reliability). The frequency of possible failures, as seen in Figure 4, forms a good basis for service providers to plan the necessary repair or maintenance activities.

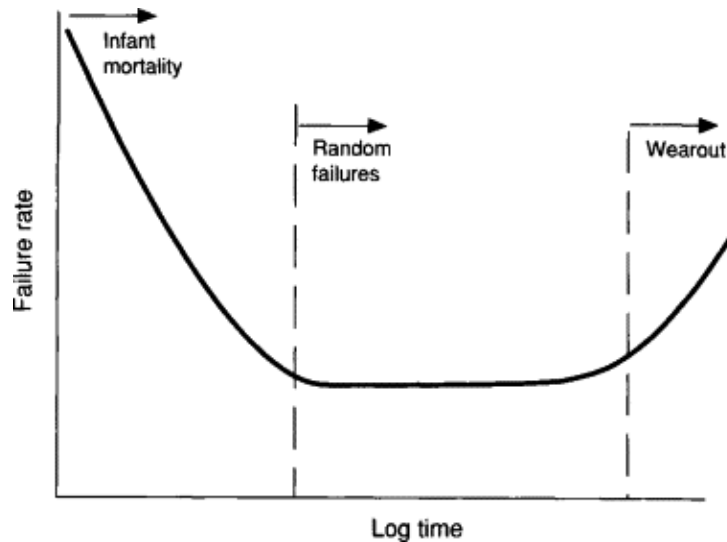


Figure 4. Bathtub curve [9]

As it can be seen, when we are talking about value creation when using the output of the value chain of a renovation process, products and service characteristics should be taken into consideration, just like when analyzing the whole value chain. The benefits of production-service value chains have been studied by several studies and experienced by many practitioners. The high product content of services or the service activities of manufacturing companies is all based on the recognition that these two forms of customer value creation carry important positive synergies.

3. Summary and further research

In product-service value chains, like the one around building material products, it can be observed that it is not only the quality of materials that determines customer satisfaction, but also the quality of service surrounding products affects the quality perceived by the customer. Thus, when determining the final customer value, the 10 + 8 dimensions of quality are judged, and not even independently of each other.

Because of the long life of building materials, the use of doors and windows shapes the value creation over several years – and along with several processes. During the long-term use, the value of the product is judged over time. This value can change according to the new experiences, and the added value of the service process is also changing during this period. However, even with changes over time, the quality and reliability of products and services must be ensured. In addition to the fundamental importance of having quality, the pursuit of reliability is also important, as both Garvin's product dimensions and Parasuraman's service dimensions are included. So, to analyze the whole process, different studies are needed.

In our research, some necessarily related studies are already conducted, some are planned:

- About *the value creation by products*, interviews were conducted with companies about the manufacturing process and the critical points, steps from the value's, quality dimensions' point of view. With the help of these qualitative analyses and their follow-ups with some quantitative information gathering (e.g., about the weights given to the different dimensions), the main value creation process related to the product and perceived by the company can be analyzed.

- To analyze *the value creation by service*, we created a survey based on the SERVQUAL scale to analyze the customers' opinions about the service part of the renovation process and the most important factors. (In this survey, we slightly started to explore customers' perceptions about the parts of the value chain, as we had to separate the phases in the customers' minds as well.)
- Related to *the value creation during the use phase*, mainly the product characteristics should be analyzed, but the service cannot be ignored. The most interesting (and challenging) task is to measure how the importance of product and service characteristics changes with time during this phase. Namely, the service experience is decisive right after the renovation work (even more important than the product), but after time these effects seem to fade. To analyze this, first qualitative analyses (focus groups) with customers are needed.

It is clear that a comprehensive, value-chained production company and its (hopefully partner) service providers need to approach value creation from two sides (product and service). In both cases, key performance measures (groups of KPIs) should be defined, along which the value (satisfaction, quality) becomes measurable and thus can be easily fed back into the organizational operation. Furthermore, if the actors of the value chain manage to capture the full lifelong value of the customers, they can have an impact on the value creation of the use phase as well.

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