Connecting Value Assessment and Dynamic Pricing of Services to the Performance Journey Mapping Framework

Elisabeth Pergler, Doris Weitlaner, Xiaoshan Liu, Angelika Höber, Thomas Loidolt
Department of IT and Business Informatics
University of Applied Sciences CAMPUS 02
Körblergasse 126, 8010 Graz, Austria
{elisabeth.pergler, doris.weitlaner, xiaoshan.liu, angelika.hoeber, thomas.loidolt}@campus02.at

Abstract. This paper introduces the integration of value and pricing into the Performance Journey Mapping (PJM) framework. Companies are often insecure when it comes to service pricing due to a lack of applicable tools and methods that support them to find an appropriate price for their services. Value-based pricing approaches turned out to be superior to other ones but lack appropriate tools and adaptations for service pricing. The connection of value assessment and service pricing within PJM and the development of a supporting tool set shall enable companies to perform value-based pricing for their services in order to obtain performance growth.

Keywords. Performance Journey Mapping, dynamic pricing, perceived value, value indicator detection, service performance

1 Introduction

The ever increasing importance of services for the market success of companies evokes new challenges for these companies when it comes to service pricing – independently from their economic sector. It is already common knowledge that companies need to understand their customers’ needs, but the actual value that services deliver to customers is still a black box for most of them. This leads to insecurity when it comes to service pricing. Traditional pricing techniques are rarely applicable to services, especially due to their specific requirements (e.g. cost-based pricing for services necessitates process cost accounting). Service pricing is, thus, performed by means of various methods and heuristics that are usually not fully systematic and value-based. There is a huge need for tools that support companies, especially small and medium-sized enterprises (SMEs), in their service pricing activities. An abundance of concepts and also some tools exist that aim at value-based pricing, which will be analyzed in the course of this paper. Many of them were developed for product pricing and are not easily transferable to the field of services. Moreover, the methodological challenges of value assessment, especially measurement problems, are widely neglected in the field.

The main objective of the present research is, thus, the development and evaluation of a useful tool (set) for value-based service pricing that can be utilized by SMEs as well. In order to achieve this objective it is necessary to answer the research question, how companies can assess value of their services and utilize the value information for service pricing.

A design science approach [6] is utilized to develop the supporting tool set to ensure the scientific quality of the iterative development process and the research outcome.

Two major challenges need to be addressed:

• First, the context dependence of service value that is caused by specific characteristics of services in general.
• Second, the dynamic interplay of price, value, and performance.

Performance Journey Mapping (PJM) [8] turned out to be a useful framework to support service performance measurement and is, therefore, utilized as fundamental basis of the present research project. In addition to the performance focus that is already realized within the PJM framework, value and price are connected to the framework, which enables value assessment as well as value-based pricing.

The remainder of the paper is organized as follows: Section 2 and 3 provide the state of the art for service value assessment and service pricing. Section 4 outlines the interplay of performance, value and pricing in existing approaches and theories. The PJM framework is briefly summarized in Section 5 and enlarged by value and price in Section 6. Furthermore, the conceptual development of the tool, methodological, and technical challenges of the development process are outlined in this section. The paper concludes with a research agenda for the development process and iterative evaluation of resulting artifacts and an outlook on future research.
2 Assessing value of services

Services can be regarded as processes [27; 29] in general. A plethora of definitions for the term (business) process is offered jointly assigning it the characteristic of being value-adding. This means concretely that value or (added) benefit for the customers is generated and, thus, that their needs are met. Hence, the customer-related value added is central for process management – a discipline that is still in its infancy concerning the integration of external stakeholders [32]. The so-called external factor is, however, an essential dimension of services.

According to the definition above the activities within a business process pursue the goal to increase the value of the process object for a customer. This implies that in an ideal situation each activity would make a (smaller or larger) direct contribution to the entire value added (see Fig. 1).

![Activities of the process/service for creating customer value](image)

Figure 1. Activities of a process/service for creating customer value

This perfect situation cannot be assumed in daily practice. It was already pointed out that customers are simultaneously recipients and destroyers of value. Especially through the integration of customers into service provision the “value-in-use” (i.e. the value is realized and consumed in the course of service delivery in co-creation of provider and consumer) together with the respective context [16; 32] moves much more into the center. The question consequently arises whether a function with sign-changing curvature(s) would be more advisable and/or closer to reality.

Notwithstanding the above, the customer value (the value added) needs to be operationalized. This is aggravated by the multiple occupancy of the term: it is roughly distinguished between the so-called customer “lifetime” and “perceived” value – two not properly delimited concepts.

Stöger [30] suggests in this regard to seize on the process idea and to calculate the item based on factors identified as being decisive for purchasing. A similar approach is followed by Carlson and Wilmot [3] in their Value Factor Analysis. This performance assessment rests, however, on the answer to the question how customers would evaluate each product's (or service's) attributes. Meanwhile, also research groups attend to the topic of value-based/oriented process management. Some interesting concepts (formulas, simulations, etc.; see e.g. [13] or [28]) descended from this movement, but the focus is rather on both the company and customer lifetime value. This might be attributable to the less problematic ascertainment of the value added from the firm’s point of view [26]. There are still few approaches (see Section 6) which attempt to do this from a customer perspective although the term customer value is firmly established in the daily parlance of various disciplines.

3 Service pricing

Pricing methods can be understood as the activities and processes firms take to arrive at their pricing decisions. Three basic types of pricing methods are applied by firms in practice: cost-based pricing, competition-based pricing, and value-based pricing [33]. Cost-based pricing methods simply add a markup on the costs of the products. Since the price of a product should at least cover the costs for it, cost-based data provide information on the lowest price (or “price floor”) that the firms can afford to offer. Competition-based pricing methods observe the prices determined by the competitive firms and make price decisions based on competitive prices. Cost-based and competition-based methods have less technical difficulties given their simplistic models and easy data access. The cost-based method is found to be effective for products with high competitive intensity [9]. Competition-based pricing plays an important role when a product can hardly distinguish itself among competition as customers will in such cases use competitors’ prices as reference [20]. However, if a product is unique and distinguishable with its particular attributes, each customer will define his own value for this product. The consumer-value-based pricing method seeks to reveal the value each customer attaches to the products. This method shifts the focus of pricing from firms and their competitors to customer demands. It also enables firms to detect the particular value of their distinguishable products perceived by potential customers. If the perceived value of a certain product is obviously higher than its producing cost, firms will have more flexible space for pricing and are more likely to make profit. Ingenbleek et al. [9] demonstrate that value-based pricing is the most effective pricing strategy for new products.

Services, as a special kind of products, are flexible to adjust themselves to satisfy both market and individual demands. Hence, value-based pricing methods could be the most suitable strategy for service firms to study their customers’ needs and provide them with desired or even personalized products. Moreover, services have certain
characteristics which hamper the application of other methods. Cost-based pricing would require data from process cost accounting and companies face problems when it comes to the allocation of staff standby times and the like. Cost-based pricing is virtually impossible for digital services that might not cause any attributable costs in single delivery. Competitor-based accounting is also difficult due to limited comparability of services as they are very heterogeneous [35]. Services also tend to be more location-bound than products and, thus, the comparison requires accurate delineation of the regional markets. Value-based pricing seems to be inappropriate as services are very context-sensitive by nature. The service delivery process is subject to a variety of contextual influences that affect the value perceptions of customers as outlined in the value-in-use concept [35].

4 The interplay of performance, value, and pricing

Various disciplines deal with the topics of performance, value, and pricing in their theories and concepts. Among these are economics, information systems research, marketing research, business administration, and psychology. Fig. 2 shows the major theoretical and conceptual linkages between performance, pricing, and value.

![Figure 2. Interplay between performance, value and pricing](image)

Price ceilings are determined by cost-efficiency due to the economic necessity to cover costs by means of revenues. More efficiency (i.e. better performance), thus, allows for lower prices. Pricing in reverse has a direct impact on performance as the price influences the financial performance in terms of turnover and other financial indicators (as for instance in balanced scorecard [11]). Performance and value are interlinked by the dynamic characteristics and context-sensitiveness of value which can be used to predict future market success in terms of demand and market potential [12]. Value of services, in turn, is generated as value-in-use throughout the service delivery process [35]. The value-in-use concept also considers provider processes, which are an important part of performance, and usage processes as immediate parts of value creation [17]. The effects of prices on value and demand are discussed in the classic theories of demand [23]. The linkage of price and value is also part of the research on value perceptions in marketing research, which identified value-for-money as an important part of perceived value [31]. The effects of value on pricing can be found in research on the willingness to pay for perceived benefits [36].

5 Performance Journey Mapping

PJM is a performance measurement framework tailored for the needs of SMEs in the service sector. Most contemporary performance measurement systems are designed for the goods-dominant logic and lack application in SMEs. This poor take-up is rooted in certain characteristics of the existing performance measurement systems [8; 21]. In a theory driven approach and in alignment with the design science principles [6] an attempt was made to overcome these barriers and resulted in the PJM framework. Based on the Technology Acceptance Model [5] and motivational psychology’s Goal-Setting Theory [15] the framework was designed to be easily implementable, enabling co-creation, and fostering acceptance of both the performance measurement systems and the benchmark goals [21]. The framework contains two central tools: the Performance Index as a pool of selected performance indicators and the Performance Journey Map as a visual representation of the service process (based on a service blueprint [27]). Both tools are engaged in a three-step process which leads from an analysis of the current state of performance measurement to a desired future state [21]. The framework and its tools have been evaluated in a first iteration. The results showed that the application of the Technology Acceptance Model and Goal-Setting Theory contributed to the achievement of the declared aims to a large extent.

In contrast to most existing performance measurement systems in the goods-dominant logic PJM has been developed in the service-dominant logic [34; 35], tempting to meet the specific requirements of services. Primary service characteristics, such as intangibility and heterogeneity, are radically respected in the PJM framework. However, services also differ from products in the way how their value is created. As opposed to readily prepared products with an “embedded value”, services can never be more than offerings [16]. They gain their value in a co-creation process, joint effort of the service provider and the customer, where the final value depends on the
usefulness experienced by the customer [36]. The service value may, hence, be rooted in the company’s performance, but it is ultimately shaped and defined by the customer’s interactions. To date, PJM is a tool which helps to measure service performance. The integration of value analysis will enlarge its practical usefulness. In this way, PJM will not only enable the improvement of service performance but the hike of service value. The value analysis is incorporated as an additional dimension in the Performance Journey Map as drafted in Fig. 3..

![Figure 3. Schematic performance journey map including value dimension](image)

The Map currently holds a visualization of the service delivery process plus the performance indicators assigned to the single process steps. The process representation, though, does not only enable the identification of performance lacks (on company side). Its visualization of the customer’s steps further enables a structured sequential analysis of where and how value emerges (on customer side). (This multi-purpose applicability of visual process representations has been noted by other researchers before, see e.g. [29].) Learning from insights gained in such a kind of
value analysis, new possibilities will arise for value creation and, consequently, for value-based pricing.

6 Implementing value and price within PJM

Now that value and pricing are connected conceptually and visually within PJM it is necessary to define the operational parts of methodology and technological support for data collection, data analysis, or data modeling respectively and the processes, which need to be implemented to perform it. The definition is based on both the findings from the state-of-the-art analysis and requirements of the PJM framework.

Hinterhuber [7] explores the obstacles for value-based pricing strategies to gain popularity among firms by conducting a survey among 81 executives in Austria, Germany, China, and the US. The survey finds out that “the difficulties in making value assessment” is the primary obstacle for companies (79% of firms) to implement value-based pricing strategies.

Among the methodologies of making assessment of consumer value (such as qualitative approaches of interviewing experts or focus groups of the product) conjoint analysis stands out to be a powerful quantitative measure of it. The conjoint analysis specifies the attributes of products and studies the importance of these attributes. For each attribute it estimates a “part-worth” percentage. By knowing the relative degrees of attribute importance, firms are able to understand more about consumers’ demands and, hence, be clearer about its developing strategies. For example, if service part A is proved to be of great importance to consumers while service part B of ignorable importance, it is than reasonable for firms to put more emphasis on its part A service. With the knowledge of the “part value” of products, firms can also stimulate the feasible prices for their new products characterized by similar studied attributes.

Besides attributes of products, demographic data of consumers (e.g. gender, age, educational background, etc.) can also be fully used within the conjoint analysis to identify different market segments and study their consuming behavior. For firms with unique products it is always desirable to know the answers to questions such as: Do young buyers value the friendliness of a service staff more than their elderly counterparts? To which extent are they different? Are these groups of customers very sensitive to price changes?

The context-sensitive character of value as defined in the value-in-use concept necessitates the inclusion of context-related data in both the value assessment and the pricing process. Contextual data mainly occur in form of data that are actively generated by users or passively generated by technology. Actively generated data refer to e.g. user interactions on various platforms or devices that are produced by users, whereas passively generated data are the outcome of technological processes of data generation behind the scenes by devices like smartphones and wearables. Both types are growing rapidly and their analysis, thus, requires (partial) automation to be feasible.

One approach to analyzing these contextual data is to mine and verify personal data from smartphones and wearables. Personal sensor devices collect various different user specific data, e.g. on-board sensing physiological information, locations, and environment based data [25]. In fact of the popularity of such devices there is a wide range of opportunities to track the user behavior and study the individual differences of each individual personality [4].

Another way is to use actively generated data and process it by means of mining methodologies. Very often user-generated data is provided in form of natural language text and, thus, necessitates text mining as a method to analyze data from natural language content. Text mining can be applied to keyword extraction or even anomaly and trend detection [2]. Kaneko et al. [10] developed a method that combines the procedure of data extraction by text mining in co-occurrence with a conjoint analysis. The process makes use of two surveys: Through the first one the attributes and correlated levels are derived from concrete demands. This result represents the input for the next phase where a second survey is conducted which provides the actual data for the conjoint analysis. Text mining is used to find categories or attributes for the conjoint analysis.

The combination of these two data types renders a flow of potential data, but they currently remain unanalyzed to a large extent [24]. Furthermore, the selection of relevant contextual data or data sets should complement the mathematical and economical models utilized for pricing.

6.1 Methodological challenges

General scales and conceptions to measure the perceived customer value exist (see e.g. [14] or [18]), but they are rather vague in the declaration (especially the sum of benefits) and leave both the concrete operationalization and collection of the single components open. Stauss and Bruhn [29] submit in this context that the benefit is not solely reflected by the willingness to pay and can, thus, not directly be expressed in monetary units. Internal (system) data may, therefore, solely partially cover the information demand and must be complemented – and in further consequence transformed – by other means. Surveys are commonly applied as data collection method in this regard. Examples are the contributions of Michalski et al. [19] (storytelling approach), Sweeney and Soutar [31] (19-item PERVAL measure for goods), and Petrick [22] (25-item SERV-PERVAL.
scale). Though, the standardized scales might be too generic for profound analyses. This calls for creative alternatives utilizing qualitative data collection methods to complement quantitative survey data. Moreover, the method triangulation will support the validation of value data and contribute to contextual interpretation of obtained data.

Schröder et al. [26] advert to the interdependence of the customer lifetime and perceived value and, thus, not to consider them in isolation. The authors called for a specific interdisciplinary instrument in the area of service controlling and presented a model design (the so-called Customer Value Added Accounting) which ascertains the value added for the customer (from a firm's point of view) taking account of the customer integration within the service creation process. This approach is, however, characterized by the vast amount of information need.

Considering the intersection of customer lifetime and perceived value it would be conceivable that – similar to the development procedure of the Customer Value Added Accounting – already established and/or approved methods for measuring the lifetime value can be adopted and adapted to the methodological requirements of conjoint analysis. The adaptation to conjoint analyses also necessitates the development of a technological artifact that enables the collection and processing of partial value data tailored to the specific needs of services.

6.2 Technical challenges

A difficult challenge to tackle is at first to figure out the relevance of passively generated context data from the devices and its influence on the process of value generation. Furthermore, the sensors for data collection need to be addressed. These can be divided into on-board and off-board sensors, e.g. the accelerometer is on-board and a wearable sensor like a smartwatch is off-board. Requirements and settings depend on the hardware and the operating systems for data collection. Each operating system has its own APIs and supports different hardware constellations. Tracking personal data, e.g. the number of phone calls per day or the average length of text messages, depends also on the operating system and how data are provided by it. Defining homogeneous interfaces or the use of platform independent frameworks to normalize data could be a way to solve this problem.

Another point based on the previous are the permissions to allow access to both types of data, user data and sensor data. Furthermore, it is important for data acquisition to find and store an efficient non redundant data structure.

The process of data extraction is influenced by the data source needed. The decision is to execute it on the device or on-line [25].

User-generated data could be analyzed and extracted in different ways as well. The preferable procedure depends on the domain and the result set.

The major technical challenge is to map the mathematical model in a generic way that enables the developed system to solve the computing process by means of user input and retrieving the predefined variables of the mathematical model employing machine learning and/or text mining.

7 Research agenda and outlook

As stated in the previous section, conjoint analysis evaluates the importance of different attributes of a product by estimating for each attribute a corresponding “partial value” percentage. Like all quantitative analyses, a reliable conjoint analysis depends fundamentally on its survey data.

Prior to the analysis on the importance of the attributes researchers should first be aware of which bundle of attributes is simultaneously attractive for customers to purchase and interesting for managers to explore. This requires, first, good communication and collaboration between researchers and managers in terms of mutual understanding of conjoint analysis and, second, good design of the survey in terms of precisely presenting (e.g. wording or imaging) the attributes to the survey participants and at the same time avoiding annoying them with excessive or complicated tasks [1].

It is planned to develop a mobile application that supports the survey process. This is necessary to reduce the complexity for participants. Traditional surveys that feed into conjoint analysis use product feature combinations including different prices and ask participants whether they would purchase the offer or not. In the case of services it makes sense to design an adaptive survey tool that considers previous value assessments as well as context factors. The adaptive survey tool will, thus, reduce the number of question items and the level of complexity of each item. Moreover, complexity can be reduced by making use of service activities, which are obtained from the service blueprint in the PJM, as parts of the service for which partial values are assessed. This approach enables dynamic shifting of item combinations along the blueprint without combining all attributes of a service in each question for the conjoint analysis.

The development of the survey tool will be based on method triangulation to make sure that the value assessments are valid. It will be necessary to evaluate the acceptance of the technological artifact as well to ensure that a lack of acceptance does not hamper value assessments.

Contextual data analysis, which is based on machine learning and/or text mining techniques, will be evaluated with regard to accuracy of context interpretations. Furthermore, qualitative methods will be applied to evaluate the relevance of contextual factors.
The pricing model that is derived from obtained data will be evaluated in terms of economic outcome. The overall evaluation is conducted in case study applications of the tool (set) including real-world data. The usefulness for SMEs and their particular requirements will be emphasized in the evaluation process.

References


