Comparative Analysis of Customer Value Dimensions

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In the current research six dimensions of customer value, namely: quality, cost, time, customization, know-how, and respect for the environment are analyzed in the following industries: automotive, electronics, furniture, food, clothing, and pharmaceutical industry. The research uses inductive approach in which a theory is emerged from the empirical data and observations. The data collection phase benefits from a trade-off based design questionnaire, which was used to collect the comparative data from end customers for each pair of customer value dimension. Due to the pair-wise format of collected data, Friedman test is employed in data analysis phase, in order to prove the validity of dataset in generating meaningful results. Findings are categorized for each dimension of customer value, where the importance of each dimension in comparison with others is discussed. The study results in customer value coefficient for each value dimension in each industry. The proposed coefficient clarifies the priority of value dimensions in different industries based on the dataset. This coefficient enables practitioners to list the corresponding industry customer values in order of importance and support the decision making process in trade-off situation, when improvement of one customer value dimension causes in reduction of the others. The developed coefficient quantitatively states how to sacrifice one and improve another dimension in favour of customer value. In a nutshell, the authors suggest to apply the customer value coefficient for the analysis of customer preferences when trade-off among value dimensions is involved.

Keywords: customer value, comparative analysis, quality, cost, time, customization, know-how, respect for the environment.

Introduction

Customer satisfaction is the main key to success in the nowadays business and industry. Enterprises are dependent upon their customers and constantly working on improvement of customer loyalty satisfaction (Shevtshenko et al., 2012). Without customers the organisation will not exist, therefore, the truly understanding of customers in the way that their products and services match with expectations of end consumer, is essential for enterprises in any industry.

The aim of the current research is to shed the light on customer value through categorizing it into different dimensions and measure them. In the optimum situation, all dimensions of customer value should be satisfied. However, in the real world scenarios, decision makers encounter situations when they are picking one dimension of customer value. In such cases, there is a need to have comparative knowledge about customer value dimensions. There is a gap in the literature on quantitative approach regarding customer value dimensions. The current research addresses this gap, discusses customer value dimensions based on data from end customers, and introduces customer value coefficient.

There are limitations to the current research. The main limitation is that it represents a snapshot at a point in time, and the subject studied may change over time. In addition, in the analysis section, dimensions of customer value are given the same importance weight. However, for some products the analysis makes more sense if value dimensions are given different importance weights. The current research provides general analysis of customer value, whereas it may be necessary for researchers and practitioners to interpret the results and customize and apply them to the markets and products they interested in. One final important point is that, in the body of this research, whenever we deal with customer value, we refer specifically to customer perceived value that is the overall feeling of customer.

The introduction is followed by the second section, which looks into the concept of customer value in the literature. The third section presents the research methodology. Findings and discussions on the collected data are allocated in the fourth section. The customer value coefficient development is introduced in the fifth section. Finally, the research is concluded in the sixth section.

Customer value

Customer value is a perceived preference for evaluation of product attributes, attribute performance, and consequences arising from use that facilitate (or block) achieving the customer’s goals and purposes in use situations (Woodruff, 1997). Without value, there is little likelihood of any sustainable market oriented development,
yet research into consumer value is still underdeveloped (Sparks et al., 2008). Research by (Graf & Maas, 2008; Gallarza et al., 2011) trace the concept of value in the literature and provide a wide range of definitions and opinions about this concept. Even so, the concept of value suffers from a prevalence of diverse definitions, which fail to give a clear picture of it. The concept of customer value and its increasing recognition as an important focus in research and practice has attracted attention of market researchers and practitioners over the last three decades (Blocker et al., 2010). Although there is an extensive theoretical literature emphasizing its importance, there are few empirical studies available in this area, due to the absence of reliable measures (Lapierre, 2000). In addition, remarkably few firms have the knowledge and capability to assess the connection between their industrial practices and the perceived value of their customers. Since firms define themselves in the context of their supply chain, it is critical for them to link and align their supply chain practices with expectations of their end customer (Maleki & Cruz-Machado, 2013). Truly understanding of customer value is fundamental to marketing and customer behaviour theory. However, because value is an abstract concept with many overlapping meanings, it is challenging to study and analyze it (Chen & Quester, 2009; Gallarza et al., 2011).

There is no consensus on the definition of customer value (Graf & Maas, 2008), but generally there are two identifiable theoretical approaches which treat customer value from the company perspective and the customer perspective. The company perspective is closely related to relationship marketing, which aims to develop and maintain profitable business relationships with selected customers. The customer perspective focuses on value generated by a company’s product or service as perceived by the customer, and relates to the fulfillment of customer goals and desires by company products and/or services.

Approaches and paradigms in industrial engineering claim to provide value for the end customer (Bej & Shang, 2006). Marketing scholars also emphasize the need for better understanding of customer value as a key point to be successful in the market (Flint et al., 2011; Ulaga, 2011). There are therefore good reasons to seek a deeper insight into customer value, yet it requires profound research and is also challenging to be in a position to generalize that understanding from industry to industry and from product to product. Blocker (2011) emphasizes the fact that customer value research in business-to-business markets has been prolific, but notes that most researches are restricted to the study of domestic and western markets, and that there is a lack of consensus on how to model customer value. Blocker (2011) develops a conceptual framework for measuring customer value and value drivers in business service relationships which builds upon his earlier work on assessing the impact of proactive customer orientation on value creation (Blocker et al., 2010). Ulaga’s (2011) commentary states that Blocker’s (2011) study lays the foundation for additional research questions from both theoretical and methodological perspective. The current research positions itself as a continuation of work in that context. Accepting the fact that customer value is hard to grasp, researchers have tried to present it in a number of ways. (Hayes & Wheelwright, 1984) adopt the company perspective and identify customer value dimensions as price (cost), quality, dependability and flexibility. Taking the same perspective (Roth & Van Der Velde, 1991) identify four dimensions in their research, namely quality, delivery, flexibility and cost. The current research categorizes customer value into six dimensions taken from the literature, namely Time (Droge et al., 2004; Sapkauskienė & Leitoniene, 2010), Quality (Gallarza et al., 2011), Cost (Virvilaite et al., 2009), Customization (Bask et al., 2011; Du et al., 2003), Know-how (Gruen et al., 2006), and Respect for the environment (Dibrell et al., 2011).

**Research Methodology**

The primary objective of this research is to identify and analyze dimensions of customer value. It employs an inductive research approach in which a theory emerges from empirical observations. The qualitative route begins with data collection, followed by description of the phenomenon from the point of view of the informants, and last comes the building of a substantive theory from the descriptive data, identifying the main variables and relationships among them. Data collection is the initial step, followed by analyzing the data to discover the knowledge embedded in data in the supply chain context. Inductive research moves from specific observations to broader generalizations. It is useful when a purpose is to learn from the available data and propose a broader conclusion. In addition, the fact that inductive research is open-ended makes it possible to discover correlations among the data (Prince & Felder, 2006).

The current research employs a structured pair-wise questionnaire in data collection. Since the purpose is fairly narrowly defined in terms of evaluating the importance of six value dimensions, closed questions are used, where respondents pick their preference from a given number of options. Data collection phase specifically collects data about the six value dimensions, namely: time, quality, cost, customization, respect for the environment, and know-how for the six industries selected - automotive, electronics, furniture, food, fashion, pharmaceuticals. The design of the questionnaire benefits from a trade-off approach.

Respondents were asked to compare their preference between each pair of value dimensions. Options are: more important and significantly more important than the other. The required sample size to conduct analysis is calculated using interval variables formula (1):\[ n = \frac{Z^2 \sigma^2}{d^2} \] (1)

In which for 0.05 level \( Z = 1.65 \), and \( \sigma \) is the ratio of standard deviation to the mean. To estimate \( \sigma \) a small sample of 20 was considered accordingly the mean and standard deviation of the variables were found as M=10.98.
and $SD=3.70$ which gives $\sigma = 0.337$. Thereafter, taking the error as $d = 0.05$, we get the sample size:

$$n = \frac{1.65^2 \times 0.337^2}{0.05^2} \approx 124$$

Due to the fact the data are collected in a pair-wise approach, Friedman test is used in data analysis. Friedman test is a non-parametric test which can test the ordering importance of each factor.

**Findings**

This section presents the research findings through analyzing the collected data [Tables 1-4]. Table 1 presents the results of pair-wise comparison of customer value dimensions. Table 2 presents the results in six different industries. In Tables 1 and 2 there are two figures in each cell representing the two preferences of respondents as: 

- significantly more important
- just more important

Tables 3 and 4 present Friedman test results for each industry and well as each customer value. The results of Friedman test in Table 3 show that Chi-squared value is significant at 0.01 level ($p<$0.01). This indicates that the mean ranks significantly differed among time, quality, cost, customization, know-how and respect-environment factors. In Table 4 Chi-squared value is significant at 0.01 level ($p<$0.01) for quality, cost, customization, and know how, it is also significant at 0.05 level ($p<$0.05) for respect environment. However, Chi-squared value in Table 4 is not significant ($p>$0.05) for time.

Discussions on data presented in Tables 1-4 are categorized in six subsections named after each customer value dimensions. This section set foundation for the fifth section in which customer value coefficient is presented.

**Quality**

Quality gets the highest mean in the six industries (Tables 3, 4). In addition, in 30 % of the comparisons it is significantly more important than other value dimensions.

Quality was judged to be significantly less important than another value less frequently than others (fewest zeros in the data base). In the pharmaceutical industry, the emphasis on quality is the strongest with 44 % of respondents thinking it significantly more important and 21
% more important (Table 1). After the pharmaceutical industry the next industries regarding the importance of the quality are food, electronics, clothes, automotive and furniture, respectively.

According to Table 2, 51% of respondents are ready to wait longer in order to get a higher quality product, and 30% of respondents said quality is more important than time, which gives an overall total of 81% respondents who attached greater importance to quality. Although quick response to customer demand is stressed in the literature (Hallgren & Olhager, 2009), these findings make it clear that quality should be given higher priority. On the other hand, only 16% of respondents thought quality is significantly more important than respect for the environment and 29% thought quality is just more important.

**Cost**

Respondents assigned the second greatest importance to cost in most of the six industries, although its level of importance varies from industry to industry. In the case of the furniture industry, cost is considered significantly more important in 21% of the comparisons giving the furniture industry the highest sensitivity to this factor (Table 1). Cost gets approximately a sum of 50% in all the rest industries. Comparing the importance attached to cost and time, the conclusion is that probably customers are prepared to sacrifice delivery time if there is a cost benefit (like the case of quality). On the other hand, 59% of respondents did not prioritize cost over respect for the environment (Table 2). Accordingly, firms and supply chains are advised to employ green practices to gain greater conformity to customer perceived value. According to holistic green production, Nissan, thinking within a bigger box, maintain that over 80 percent of carbon savings are only achieved when designing the supply chain with respect for the environment.

**Time**

Friedman test results (Table 4) show that Chi-squared value is not significant (p>0.05) and the mean ranks are not significantly different between different industries. Time is assigned the lowest level of importance in all industries. In the pharmaceutical industry it is assigned the highest value, but even in this industry, it is rated as significantly more important than other value dimensions in only 11% of the cases. Its importance is least appreciated in the automotive industry where only 3% of respondents found it significantly more important and only 12% found it more important than other customer value dimensions (Table 1). According to the dataset, time is rated as significantly more important than other customer value dimensions by 3% of respondents in the automotive industry, 4% in electronics, 4% in furniture, 5% in food, 5% in fashion, and 11% in the pharmaceutical industry, while it was described as more important than other value dimensions by 12% in the automotive industry, 14% in electronics, 12% in furniture, 14% in food, 8% in fashion, and 8% in pharmaceutical industries.

Looking into comparisons of time with other dimensions of customer value reveals the fact that most respondents prefer to sacrifice time to gain other dimensions of value. Time fared best in comparison with customization, where it was considered significantly more important in 7% of the cases and more important in 18%, giving a total of 25% (Table 2).

**Customization**

Customization of products is an option given to customers to modify the product they buy according to their specific preferences. The level of customization significantly influences the type of practices enterprises employ to manufacture products. Customization is considered significantly more important in only 6% of the cases in the pharmaceutical industry as well as in 11% of the cases in the furniture and fashion industries. It is considered more important in 14% of the cases in the pharmaceutical industry, and 18% in the furniture and fashion industries. Its values were the highest in the furniture and fashion industries, and lowest in the pharmaceutical industry. According to the responses in the dataset, customization is considered significantly more important than other value dimensions by 7% of respondents in the automotive industry, 7% in electronics, 11% in furniture, 7% in food, 11% in fashion, and 6% in the pharmaceutical industry. Moreover, customization is considered more important than other value dimensions by 16% in the automotive industry, 17% in electronics, 18% in furniture, 16% in food, 18% in fashion, and 14% in the pharmaceutical industry (Table 1).

Comparison of customization with other dimensions of customer value reveals the fact that this factor is considered significantly more important than others in a range from 4% (compared with respect for the environment) to 7% (compared to know-how) which is a very low score. It is clear that in 93% to 96% of responses customization is not rated as significantly more important than others. In addition, customization is just more important than other value dimensions in 8% of the cases (compared to quality) and 34% (compared to know-how) (Table 2). Although (Tu et al., 2001) emphasize the importance of customization as a critical customer value; the findings of the current research show that customization is addressed by customers only after other dimensions of value are satisfied.

**Know-how**

Customer know-how is an initial knowledge of customers when buying a product. For instance in the electronics industry, customer know-how refers to the initial knowledge of the customer about the functionality of the product. However, in the fashion and furniture industries it refers to the initial knowledge of customer about the way products are produced. Customer know-how is assigned the highest score in the pharmaceutical industry rating it as significantly more important by 19% and as more important by 15%. Summing up the scores of significantly more important and more important, know-how was given an overall score of 28% in the automotive industry, 30% in electronics, 23% in furniture, 23% in food, 17% in fashion, and 34% in the pharmaceutical industry.
industry. With the exception of the pharmaceutical industry, which deals with human health issues, know-how is described as significantly more important by fewer than 10% of respondents in the other industries (Table 1).

Comparing the importance of know-how to other value dimensions, it scores best against time, where it is significantly more important in 20% of the cases and more important in 26% (Table 2). (Gruen et al., 2006) found that customer know-how has a positive impact on customer loyalty and the overall perceived value of the firm by the customer, whereas the finding of this research develops that understanding of this value by suggesting that know-how is an important customer value after other value dimensions have been satisfied.

**Respect for the environment**

Friedman test results show that Chi-squared value is significant at 0.05 level (p<0.05) which indicates that the mean ranks significantly differed between different industries. According to the results of the current research, respect for environment is significantly more important than other value dimensions in a range from 13% of the cases in the electronics industry, to 18% of the cases in the furniture and food industries. It is also more important than other value dimensions in a range from 19% in the pharmaceutical industry to 30% in the automotive industry. In a survey in automotive industry, (Gonzalez et al., 2008) found a positive relation between the possession of certified EMS, specifically ISO 14001 and eco-management and audit scheme, and the environmental demands. The present research adds to that research, which was conducted from the company perspective, to suggest that environmental standards contribute to value dimensions as well as those of companies. After the automotive industry, the electronics industry receives the highest importance rate by 29%. In the comparison between respect for the environment and other customer value dimensions, in the electronics industry, 42% of respondents gave overall priority to respect for the environment, while the corresponding figure was 47% in the automotive industry, 41% in furniture, 41% in food, 38% in fashion, and 35% in the pharmaceutical industry (Table 1).

Comparison of respect for the environment with other dimensions of customer value indicates that 8% rated it as significantly more important than quality, 25% regarded it as more important than time, 15% considered it more important than quality. Adding together the scores for significantly more important and more important, 52% of respondents chose respect for the environment over time and customization. This result supports the argument by (Kammerer, 2009) who said that green products which besides the public benefits, have private environmental benefits for the customer (e.g. energy savings) will generate stronger consumer demand and can thus constitute firm’s motivation. According to the findings of Kammerer (2009) as well as the current research, respect for the environment is of increasing importance to both firms and customers (Table 2).

**Customer value coefficient**

In this section, the six dimensions of customer value and the six studied industries are put together to present the overall findings. Since in the data collection phase respondents had two importance levels to compare value dimensions stated as significantly more important and more important, so a coefficient is presented to have one unique number for each value dimension in each of the industries. This coefficient gives double importance if respondent selects significantly more important. The coefficient counts the number of 4’s in the dataset, makes it double, and adds it to the count of 3’s in the dataset. Thereafter, the average of this value is calculated and finally divided by the sum of other dimensions of customer value to result in the share of each customer value (2).

\[
CV_i = \left[ 2 \times \text{COUNTIF} (\text{Range}, 4) + \text{COUNTIF} (\text{Range}, 3) \right] \times \frac{1}{\text{Total}} \sum_{i=1}^{6} CV_i
\]

Figure 1 presents coefficient of the six dimensions of customer value in the six industries. Quality gets its highest importance in the pharmaceutical industry then respectably food, fashion, electronics, automotive, and furniture. Respondents give the highest importance to cost in the furniture and fashion industries thereafter automotive, electronics, food, and pharmaceuticals. Time is the least important value in the six industries. However, its most importance rate is in the pharmaceutical industry and after that come the food, electronics, furniture, fashion, and automotive industries. Due to the fact that the difference between the highest and lowest time coefficients is only 0.03, we argue that firms and supply chains should put their effort on improving other value dimensions. The next customer value is customization which is most appreciated in the furniture and fashion industries with the coefficient of 0.14. Thereafter go automotive, electronics, food, and pharmaceuticals. Know-how receives its highest coefficient in the pharmaceutical industry by 0.16 and after it respectably the electronics, automotive, food, furniture, and fashion industries. The last customer value coefficient is respect for the environment that receives its highest coefficient in the automotive industry by 0.21 and after it come the furniture, electronics, food, fashion, and pharmaceutical industry (Figure 1).

Decision makers in these six industries can benefit from the findings of this research in situations where the final result of their decision will lead in contributing to one customer value and harming another. In such cases, they can refer to the current study and find the importance level of competing value dimensions in order to make an appropriate decision. Decision makers should manage the practices that are employed in different sections of the supply chain, from raw materials at the upstream end to market and consumption in the downstream end, in a way as to contribute to customer value dimensions. Therefore, all efforts across supply chain will be aligned with what the end customer expects.
Conclusion

In current research the authors suggest to use the inductive methodology in order to discover trade-offs among six dimensions of customer value, namely: quality, cost, time, customization, know-how, and respect for the environment in the six industries, namely: automotive, electronics, furniture, food, fashion, and pharmaceutical industries. It employs a questionnaire in the data collection phase. The analysis phase uses a pair-wise analysis to compare value dimensions across industries as well as comparisons among value dimensions themselves. In addition, the customer value coefficient is developed based on the dataset which dedicates a coefficient to each customer value in each of the six studied industries.

In many real case scenarios satisfying all dimensions of customer value is not feasible. Therefore, decision makers face the situation when the preference should be given to one of them. As another application, in contingency plans improving one customer value may result in sacrificing others. The pair-wise analysis and findings of the current research come to assist decision makers in such cases. The customer value coefficient gives a quantitative measure based on end customer comparative data about trade-offs. This coefficient facilitates decision making procedure in accordance with customer preferences.

This research lays the foundation for further studies that connect customer value dimensions with supply chain practices. Managers can benefit from these findings in the design, analysis, and improvement of their supply chain in order to objectively contribute to the end customer.

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**Vartotojo vertybių dydžių lyginamoji analizė**

Santrauka

Tikslius nustatymas vartotojo lūkesčių, yra rakta į dabartinių įmonių išsamiumą ir sėkmę. Siekiant nustatyti kam vartotojas teikia pirmenybes, įmonė turi tam atlikti išsamius kiekvienus tyrimus. Vartotojo vertybių sąvoka patraukė ir tyrinėtojų, ir praktikų, kurie nušvietė skirtingus jos aspektus, dėmesį. Tačiau teorinėje literatūroje dažniausiai pateikiami būdai, kurie skirsto vartotojo vertybes į matuojamus dydžius, taigi skaičiais įvertina kiekvieną dydį. Šis tyrimas pateikia empirinio vartotojų vertybių dydžių tyrimo rezultatus. Autoriai, remdamiesi literatūra, nustatė šešis vartotojų vertybių dydžius. Tai: kokybė, kaina, laikas, pritaikymas, mokslinė/techninė informacija ir pagarba aplinkai. Vartotojo vertybių dydžiai yra nagrinėjami įvairiuose pramonės šakose: automobilių, elektronikos, baldų, maisto, drabužių, ir farmacijos. Duomenų rinkimas buvo atliktas panaudojant lyginamajį metodą, kur kiekvieną vertybių dydžių porą įveikiant į ankščiau paminėtas pramonės šakas. Po to naudojamas *Friedman* testas, kad būtų patikrinta duomenų rinkinio svarba. Pagrindinėje šio darbo dalyje kiekvienam vartotojo vertybių dydžiui yra skirtas atskiras skyrius ir yra diskutuojama apie rezultatus, susijusius su to dydžio detalėmis. Vėliau autoriai skirtinus rezultatus susumuoja, norėdami sukursti vartotojo vertybių koeficientą. Šis koeficientas pateikia vartotojo vertybių dydžių santykines svarbos kiekvieną skaičiuojant pramonės šakose. Remiantis šio tyrimo duomenų lentele, vartotojo vertybių koeficientai įvairiuose pramonės šakose nustatyti tokie:

- Automobilių pramonėje: kokybė = 0.26; kaina = 0.23; laikas = 0.06; pritaikymas = 0.12; mokslinė/techninė informacija = 0.12; pagarba aplinkai = 0.12.
- Elektronikos pramonėje: kokybė = 0.27; kaina = 0.23; laikas = 0.08; pritaikymas = 0.11; mokslinė/techninė informacija = 0.13; pagarba aplinkai = 0.19.
- Baldų pramonėje: kokybė = 0.25; kaina = 0.24; laikas = 0.07; pritaikymas = 0.14; mokslinė/techninė informacija = 0.10; pagarba aplinkai = 0.20.
- Maisto pramonėje: kokybė = 0.33; kaina = 0.20; laikas = 0.08; pritaikymas = 0.10; mokslinė/techninė informacija = 0.11; pagarba aplinkai = 0.19.
- Drabužių pramonėje: kokybė = 0.28; kaina = 0.24; laikas = 0.06; pritaikymas = 0.14; mokslinė/techninė informacija = 0.08; pagarba aplinkai = 0.19.
- Farmacijos pramonėje: kokybė = 0.34; kaina = 0.17; laikas = 0.09; pritaikymas = 0.08; mokslinė/techninė informacija = 0.16; pagarba aplinkai = 0.16.

Kadangi duomenų rinkimas buvo atliktas poriniu metodu, o sukurtas koeficientas yra glaudžiai susijęs su empiriniais duomenimis, autoriai tiki, kad vadovams ir sprendimus priimantiems asmenims šio tyrimo rezultatai bus naudingi. Jie leidžia jiems gailinėtis įmonės ir tiekimo grandinę pagal tai, kam jų vartotojai teikia pirmenybę. Tiksliau sakant, šio tyrimo rezultatai suteikia galimybę kiekvienai įmonei įvertinti, kas lemia vartotojo vertybių pasirinkimo pirmenybę.

**Raktažodžiai:** vartotojo vertė, lyginamoji analizė, kokybė, kaina, laikas, pritaikymas, mokslinė/techninė informacija, pagarba aplinkai.

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