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HOW TO MANAGE THE SEGMENT-OF-ONE? A FRAMEWORK TO REDUCE CUSTOMER COMPLEXITY

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Research paper

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Abstract

The after-sales business is the most profitable area within the automotive industry. All manufacturers seek to tighten their ties with end customers in order to ensure loyalty and foster economic success. In times of dramatic change in the automotive industry (switch from combustion to electric engines, etc.), digitalization plays an evermore important role for developing sustainable business models. End customers in after-sales are as individual as their cars. In an ideal case, every customer is addressed individually, taking the individual's specific needs into account: the classic, but rather complex segment-of-one. This paper presents a multi-dimensional framework for customer segmentation in the automotive after-sales domain which uses a reduced number of segments. It addresses end customers on a perceived individual basis while reducing the complexity significantly compared to a full segment-of-one-approach. It provides a holistic view on customers' characteristics, taking into account their specific vehicle needs for maintenance as well as several factors defining the individual's approach to services delivered by the car manufacturer. As such, a perceived segment-of-one is provided. The concept was evaluated using a qualitative study with industry experts and stakeholder representatives. Based on the findings, recommendations for the application of the framework in practice are provided.

Keywords: Customer Segmentation, Segment-of-one, Prototype, Automotive industry, After-sales domain.

1 Introduction

The automotive after-sales sector is the most important business area in the automotive industry, both in financial terms and regarding customer loyalty. In Germany, the after-sales share of total turnover is around 20%, whereas, with respect to profits, after-sales services contribute up to 60% to corporate revenue (Brandenburg, 2012, p. 31). As such, it is an essential source of income for both manufacturing companies (Original Equipment Manufacturers, OEMs) and car dealerships, making it a "top priority for all automotive manufacturers" (Verstrepen et al., 1999). With respect to end consumers, providing optimal after-sales services leads to increased customer satisfaction, longer lasting relationships and thus loyalty (Bloemer and Lemmink, 1992; Brandenburg, 2012).

The global trends towards personalization and rising customer expectations require a stronger focus on individualized service. Offerings need to be customized to the particular customers' characteristics (Brachat, 2012). Different groups of consumers have diverging expectations towards service providers, underlining the assumption that different customer segments prefer specific elements of service (Gilmour et al., 1982; Athanassopoulos, 2000). In an ideal case, the OEM would serve every end customer on an individual basis, a so call "segment-of-one". As this is economically not feasible, advanced segmentation mechanisms become a significant capacity supporting competitive advantage (McKee et al., 1989; Vorhies et al., 1999). Many authors of academic as well as practitioner's literature discussed the concept of segmentation for marketing purposes. However, only few studies have dealt with segmenting customers in the very specific automotive industry (Tsai et al., 2015). No papers were found to address the existing segmentation challenges in the specifics of the automotive after-sales market (i.e. one OEM reaching out to several million end customers in a largely pre-defined mechanism of service intervals).

To add to current knowledge, this paper presents a framework for customer segmentation in the automotive after-sales market. The aim was to identify a limited set of end-customers qualitative and quantitative key-characteristics that allow customer segmentation with a reduced number of segments while providing a perceived individual treatment through the OEM.

The paper follows the Design Science Research (DSR) approach of Hevner et al. (2004). A prototype was developed and tested with experts in the field.

The paper is organized as follows: In section 2 the current state of research is illustrated in the literature review. Section 3 describes the design of the proposed segmentation framework. Its qualitative evaluation is presented in section 4, and the limitations of the study and an outlook to further research are discussed in section 5. We conclude with a summary of our findings.

2 Literature Review

The academic literature provides numerous concepts and methodologies dealing with the subject of segmentation. The idea is derived from the underlying presumption that consumers differ in their needs and buying patterns (Green, 1977; Wind, 1978). This variety can be managed by determining homogeneous groups of customers who resemble each other in certain characteristics. Thus, customer-related objectives such as acquisition, relationships and loyalty are pursued (Sausen et al., 2005; Hultén, 2007; Melnic, 2016).

2.1 Conceptual specifications of segmentation

The segmentation process considers various aspects. With respect to the sequential dimension, segments may be formed according to four fundamental procedures, namely "a priori", "post hoc", "flexible" and conjoint analysis segmentation (Green, 1977; Wind, 1978; Green and Krieger, 1991; Wedel and Kamakura, 2000). Additionally, the size of segments may roughly be classified as "macro", "micro" and "one-to-one" in order of granularity (Wind and Cardozo, 1974; Datta, 1996; Hultén,

2007). The extent of target groups, also referred to as "units of analysis" (Sausen et al., 2005) varies from an entire market to the individual consumer (Wedel and Kamakura, 2002). Moreover, two different types of customers are addressed in the marketing literature, namely business customers and individual consumers (Han et al., 2012).

2.2   Data mining methods

In recent years, due to the evolution of respective information technologies, "sophisticated data analysis techniques" like data mining shifted into the focus of research on customer segmentation (Hiziroglu, 2013). In this context, the most common technique is cluster analysis, which was discussed by many authors (e.g. Wedel and Kamakura, 1998; Sausen et al., 2005; Qiasi et al., 2012; Hiziroglu, 2013; Hamka et al., 2014; Koudehi et al., 2014; Tsai et al., 2015; Kuo et al., 2016). In most cases, it ewas combined with the k-means (Arndt and Langbein, 2002; Sausen et al., 2005; Chen et al., 2007; Füller and Matzler, 2008; Liang, 2010; Khajvand and Tarokh, 2011; Fogliatto et al., 2012; Qiasi et al., 2012; Koudehi et al., 2014; Tsai et al., 2015; Huerta-Muñoz et al., 2017) or two-step algorithms (Khajvand and Tarokh, 2011; Qiasi et al., 2012), both aiming to find the optimal number of clusters by "maximiz[ing] intercluster distances" and "minimizing intracluster distances" (Khajvand and Tarokh, 2011). In addition, artificial neural networks, complex relations and classification have been analyzed (Fazlzadeh and Kermani, 2010; Tkáč and Verner, 2016) and applied to segmentation (Chan, 2005, 2008; Fazlzadeh and Kermani, 2010; Hiziroglu, 2013).

2.3   Selection of segmentation bases

In the customer-focused context of this paper segmentation bases are defined as compositions of "characteristics that [are] used to assign customers to segments" (Steenkamp and Hofstede, 2002). With regard to "general observable" variables (Wedel and Kamakura, 2000), many authors refer to geographic categories (Barone and Bella, 2004), demographic characteristics (Hamka et al., 2014; Ieva and Ziliani, 2017) and socioeconomic variables (Datta, 1996; Ieva and Ziliani, 2017). Much attention was also paid to "general unobservable" variables (Wedel and Kamakura, 2000) such as psychographic facets, customers' attitudes, interests and lifestyles (Hamka et al., 2014). Further variables frequently mentioned relate to customer behaviour (Han et al., 2012), including subcategories such as consumer profitability and product usage patterns (Zeithaml et al., 2001; Hamka et al., 2014).

2.4   Existing frameworks in the automotive after-sales domain

Academic literature as well as commercial institutions propose various frameworks dealing with segmentation related issues. In the majority of cases, several segmentation variables are combined aiming to provide better outcomes than single variable approaches (Gorenstein, 2001). Generic frameworks encompass profitability aspects such as the Pareto principle and customer value (Chen et al., 2007; Tsai et al., 2015). With regard to behavioural patterns, most frequently the RFM (Recency, Frequency, Monetary) analysis was discussed (Jonker et al., 2004; Tsai et al., 2015; Abirami and Pattabiraman, 2016; Alborzi and Khanbabaei, 2016; Peker et al., 2017; Singh and Singh, 2017). In addition, the literature proposes interdisciplinary models such as a three-dimensional framework containing customer, product and "situation-benefit-specific" elements, providing an integrated approach to segmentation (Datta, 1996). Segmentation according to "lifestyle groups" is a strategy discussed by academic, as well as practitioners. In Germany, customer groups resembling each other in lifestyles, values, attitudes and behaviour are presented in frameworks such as "The Sigma milieus", "Sinus milieus" and "The Limbic types" (GIK, 2014).

With respect to the automotive sector, however, segmentation related topics were considered only to a minor extent. For instance, price sensitivity, relational and service preferences could be used to identify customer segments for buyers of automobiles (Odekerken-Schröder et al., 2003). Tsai et al.

(2015) form various groups on the basis of "car typolog[ies]" of licensed drivers within the scope of the German market (GIK, 2014). Aspects specifically relating to the after-sales field include for instance satisfaction with the maintenance service regarding speedy appointments, service advisors, user-friendly service and quality matters. According to a concept developed by German practitioners, the segmentation procedure needs to involve values, needs, lifestyles, behaviour, demographic and socio-economic aspects and results in six segments (Kleimann et al., 2013). However, most existing approaches do not contain segmentation according to the customer's situation or the occasion of the customer contact.

2.5 Segment-of-One

A strong research strand is concerned with customer treatment in a marketing related context, specifically satisfying the exact needs of customers by providing them with individualized offerings (Simonson, 2005). Some exemplary concepts are one-to-one or micro marketing (Fowler et al., 2013), mass customization (Fogliatto et al., 2012) and Customer Relationship Management (CRM) (Payne and Frow, 2005; Galal et al., 2016). Many authors consider CRM systems a crucial business concept for staying ahead of competition. Benefits include customer retention, customer profitability, customized and high quality products and services (Stone et al., 1996; Jutla et al., 2001; Kim et al., 2006). However, to ensure the effectiveness of CRM segmentation activities are to be taken into consideration as well (Tsai et al., 2015).

2.6 Emerging Research Gap

The aforementioned leads towards a research gap: The question to what extent segments should be scaled down to meet individual customers' demands, i.e. the trend of individualization towards the ultimate form of segmentation, the so-called "segment of one" (Datta, 1996).

Few studies have dealt with segmenting customers in the automotive industry and approaches combining several variables are stated to be non-existent (Tsai et al., 2015). To contribute to knowledge, this paper proposes an approach for segmenting customers into a "perceived segment-of-one" while avoiding the level of granularity necessary to achieve a "true segment-of-one".

Due to the increasing difficulty of segmentation and the necessity of considering criteria of higher complexity (Godlevskaja et al., 2011) an overall comprehensive framework for segmentation is needed in the automotive after-sales domain to assist car dealerships with the increase and retention of their customer base (Darley et al., 2008). Recent literature proposes to group customers by psychographic and demographic variables and further combine them with factors such as expectations regarding services (Hamka et al., 2014) in consideration of increasingly individual consumer demands (Godlevskaja et al., 2011). Different customer groups have diverging expectations towards service providers implying that different segments prefer specific elements of service (Athanassopoulos, 2000).

This leads to the research question of this paper: *How should customers be segmented in automotive after-sales in Germany to meet their individual service expectations?*

3   Research Method

The stated research question calls for a design science oriented approach in which scientific insight is gained from the design and subsequent evaluation of an artifact. Here, the artifact studied is the proposed customer segmentation framework for future automotive after sales business. In the DSR framework, the actual design research activity creating the artifact is embedded between the environment (practical problem space) and the scientific body of knowledge (providing existing theories, methods, concepts etc.) (Hevner et al., 2004). While the environment provides the requirements for the design of the artifact and allows to field test and apply it (relevance cycle), the

body of knowledge provides the scientific state of the art forming the basis for the design and evaluation activities and allows to disseminate the results obtained (rigor cycle). Figure 1 illustrates the respective DSR methodology used in this paper.
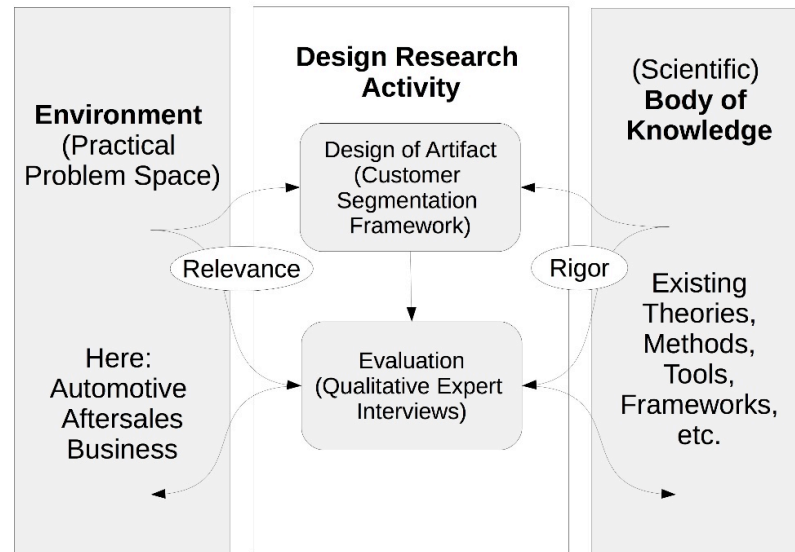

Figure 1.   Schematic overview of the Design Science Research (DSR) methodology used in this paper (own illustration based on Hevner et al. (2004)).

4 Research Approach

Following the DSR approach, first the requirements and basic principles for the proposed customer segmentation framework were derived from the literature. Based on this, the overall structure of the framework was designed. Second, the relevant customer segments were identified and integrated into the framework, resulting in an initial Version 1. The resulting framework (the artifact) was evaluated and subsequently improved by a qualitative study with respect to its applicability in practical business contexts and its coverage of strategic and operational aspects. In figure 2, an overview of this research process is provided, including the sequential procedure of the conduct of interviews and the revisions of the framework.
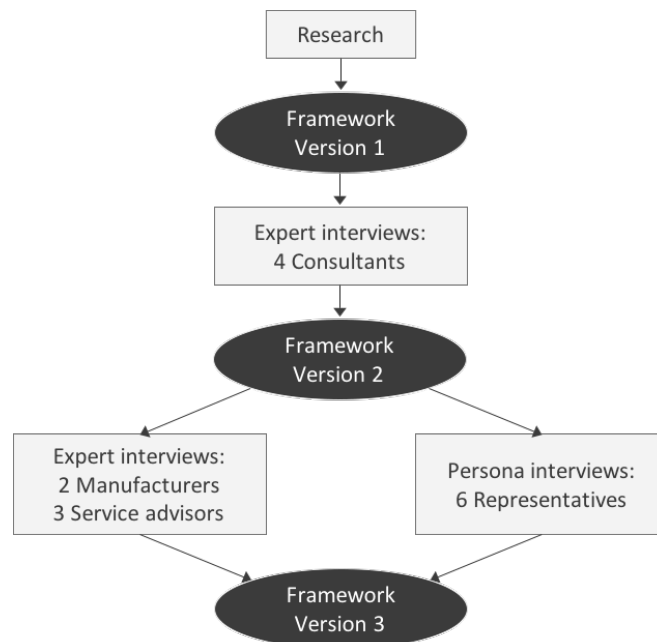
Figure 2.   Research process with interviews and revision of the proposed framework.

For the proof-of-concept, a two-step evaluation-and-improvement cycle was used: First, four automotive aftersales experts (business consultants) were interviewed to assess the overall framework and its implications for practice. Based on the findings of these interviews, an improved version 2 of the segmentation framework was designed.

Version 2 of the framework was evaluated by different groups of stakeholders: Field experts actually working in automotive aftersales (two from an automotive OEM and three service advisors from car dealerships), as well as six customers selected according to the personas previously designed to describe the proposed customer segments of the framework.

Based on this evaluation, the framework was revised, resulting in the final Version 3.

5 Design of the Artifact: The Segmentation Framework

There are various requirements for the framework's characteristics emerging from the literature review. Firstly, the model is supposed to be applicable in practical business contexts to overcome the gap between theoretical and practical segmentation (Sausen et al., 2005). It should be easy to understand and to implement (Haenlein et al., 2007), flexible (Palmer and Millier, 2004), and prioritizing (Khajvand and Tarokh, 2011). On the other hand, strategic and operational dimensions are

to be aligned implying the necessity of cooperation between manufacturers (strategic part) and car dealerships (operational part) (Oerder and Wegerer, 2014).

5.1 Three-dimensional structure

An existing segmentation approach proposes a framework consisting of three dimensions: customer characteristics, product characteristics and "situation-benefit-specific" customer characteristics (Datta, 1996). This approach has been selected as the basis for the framework developed in this paper for the following reasons: As outlined in section 2.2., many more recent approaches focus on data-driven segmentation and empirically based bottom up approaches using various data mining techniques. Other approaches focus on single or partially combined segmentation bases and are limited to personal characteristics, profitability and behavior of consumers. However, none of these approaches establishes a link between customers, their respective product and the occasion of the customer contact.

In contrast, the framework by Datta (1996) is a top-down approach providing a holistic, three-dimensional view on a conceptual level, which fits well to the objectiive of this paper to develop a conceptual framework for customer segmentation. The three dimensions proposed by Datta (1996) form an adequate structure for linking customer characteristics, product features and particular occasions and therefore have been selected as the starting point for the proposed framework.

As this original concept is not industry-specific, its components first have been adapted to the automotive after-sales context.. There, the customer dimension refers to the car manufacturer's existing clients demanding specific after-sales services. Second, product characteristics are modeled to reflect the vehicle owned or utilized by the customer, as it requires maintenance (Darley et al., 2008) and thereby actually triggers the need for after-sales services. Finally, car dealers are the actors most concerned with processes and interactions with respect to service customers (Oerder and Wegerer, 2014). Therefore, the third situational dimension reflects the occasion of a customer visiting the dealer.

5.2 Selection of segmentation bases

With regard to sequential aspects and segment granularity, two automotive after-sales related segmentation variables are defined for each dimension in the first step. These segments are mapped onto two-dimensional matrices consisting of two axes for each segmentation base in all the three dimensions, resulting in four a priori determined macro segments. Subsequently, they are ranked and assigned to priority levels ranging from A to D by descending importance (Kotler, 1989). The resulting macro segments are one component of the final framework and depicted in the upper part of Figure 3. With respect to the customer dimension, an additional process step is carried out as increasingly individualized consumer demands result in an (unwantedly) increasing number of segments (Godlevskaja et al., 2011). Thus, the customer macro segmentation bases are subdivided through further granulation of the customer characteristics and three-step scales, defining the respective extent per characteristic. This approach results in 2,916 fine-tuned micro segmentation bases depicted in an extended customer matrix in Figure 2. The 2,916 segmentation bases result from the six expectation dimensions with three steps each -, times the four possible values of the profitability dimension.
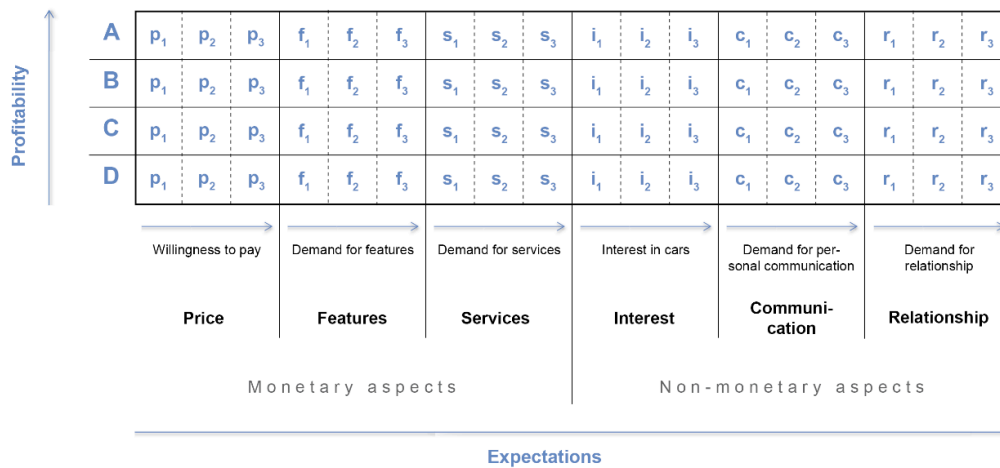
Figure 3.   *Extended customer matrix.*

5.3   Specification of particular segments

The customer, vehicle and occasion dimension consist of four macro segments each, and the fine-tuned customer matrix allows the determination of 2,916 customer segments. This outcome suggests high complexity - however, the framework is to be easily understandable and applicable. Thus, in the next step, particular segments are identified in every dimension of combination possibilities. Moreover, meaningful names are assigned to these micro segments to provide a "qualitative understanding" facilitating communication within a company (Palmer and Millier, 2004). Subsequently, the micro segments are arranged in the macro segments prioritization matrices according to the respective characteristics and priorities. Each step is depicted in one row of the framework in Figure 3, in accordance with the sequential order of the process.

The formation of customer segments is based on merging two recent statistical surveys, segmenting German customers according to car typologies and preferences about after-sales services (Kleimann et al., 2013; GIK, 2014). The identified six micro segments are then mapped onto the extended customer matrix, resulting for instance in a "A p3 f3 s3 i3 c3 r3" segment. In order to reduce complexity, the small caps letters –which indicate the expectation dimensions- are omitted and the respective index values determining the extent of characteristics are accumulated, making them suitable for the superordinate framework. The result of this procedure is for instance an "A18" segment describing the most profitable and expectant segment of "Car Enthusiasts" as well as "D6" customers, depicting the opposite extreme case of "Disinterested Penny Pinchers". With respect to the vehicle and occasion dimension, segments are specified to findings in both the academic and practitioner's literature. The results of this procedure are depicted in the micro segments section of Figure 3. In order to create an integrated encompassing framework, all micro segments are mapped onto the dimension specific macro segment matrices in the subsequent step. The resulting combined prioritization matrices are represented in the third row of Figure 3.

5.4   Generation of operational implications

For the purpose of practical applicability, particular segments from each dimension are combined, depicting a specific case of customer contact in the everyday business. Hence, these recommendations consist of three attributes: the value of the customer, vehicle and occasion segment, extracted from the respective matrices. The total number of combinations equals 216. Due to this richness, two exemplary action recommendations are depicted in the fourth row of Figure 3. The example contains two extreme situations in terms of priority. The situation with the highest priority is a combination of

"$A_{18}AA$". It occurs when a Car Enthusiast (A_{18}) with a new premium car model (A) enters the car dealership due to a recent accident implying huge repairs (A). In contrast, a Disinterested Penny Pincher ($D_{6)}$ driving an old, low-priced model (D) and needing a tire change is (D) assigned to the priority of "D_6DD".
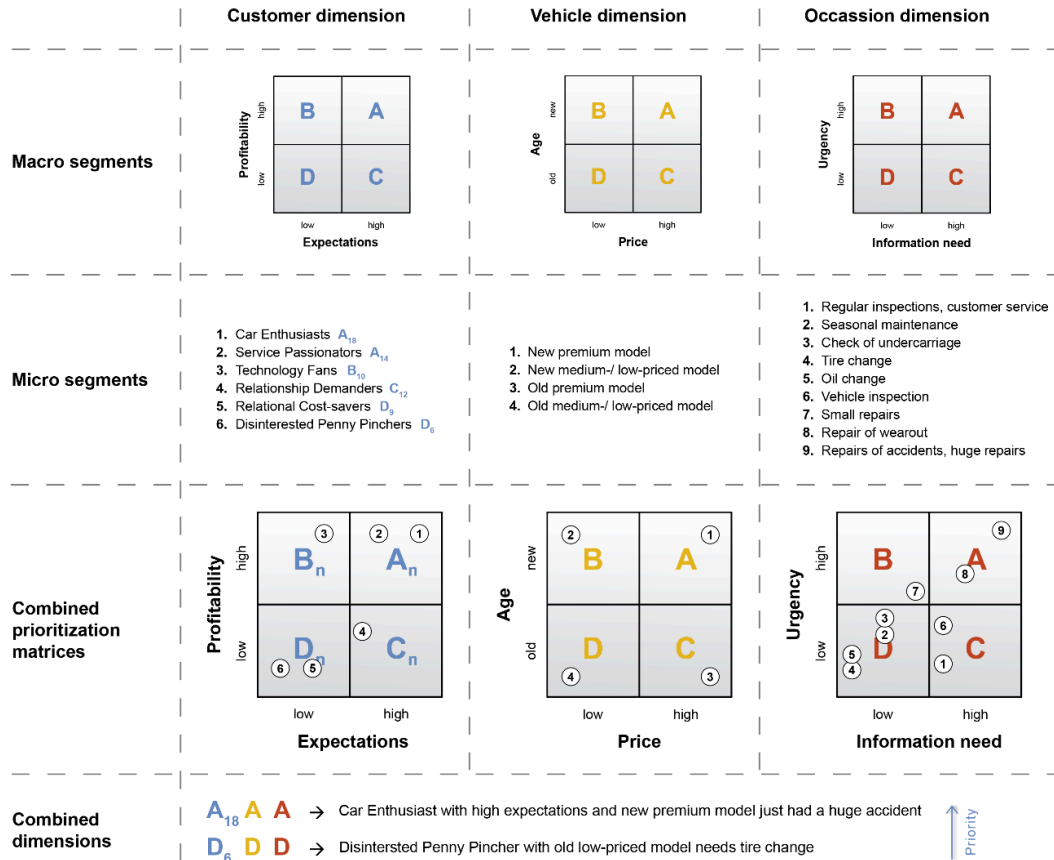

Figure 4.   Proposed representation of the final integrated version of the framework.

6   Qualitative evaluation

The proposed framework was evaluated with regard to applicability in practical business contexts in strategic and operational dimensions. In this deductive approach, data was collected by means of 15 interviews and voice recording software, followed by qualitative analysis using audio transcription and qualitative data analysis software as suggested by Yin (2011). Three categories of automotive aftersales experts were selected, reflecting the relevant stakeholder groups of the framework: four business consultants, two representatives of manufacturers and three service advisors. All interviewees were selected according to their longstanding professional experience and specialization in different strategic and operational areas of the automotive aftersales business.

The six customer segments characterized by the personas were evaluated by means of interviewing a convenience sample of six respective customers. A precondition for their selection was the ownership of a car, so they could respond on the basis of their own experiences to ensure the authenticity and reliability of the answers.

6.1 Data collection

The qualitative evaluation was performed using semi-structured interviews. They were conducted using an interview guideline with open questions designed in advance. The duration of the interviews ranged from 22 to 40 minutes, depending on the interviewees. Seven of the interviews were performed face-to-face, but in the remaining eight cases telephone interviews had to be used due to large physical distances. All interviews were audio recorded, transcribed and analysed using coding based on the framework structure. The analysis and coding of the transcribed interviews was performed using the MAXQDA and Excel applications.

As outlined in figure 2, in the initial phase of the data collection, the first version of the framework was evaluated. For this purpose, four expert interviews were conducted with experienced and specialized business consultants in the automotive aftersales field. Based on the findings, a second version of the framework was created, incorporating the findings of the interviews. In the next phase, the revised version was presented to five experts of two other groups. Two automotive manufacturer representatives and three car dealership representatives were asked to evaluate the proposed framework regarding various aspects.

Simultaneously, persona interviews were conducted with the six customers representing the customer segments, to review to what extent the previously defined customer expectations in different after-sales service occasions corresponded to real customers' wants and needs. For each respondent group, interview questions were adapted to be appropriate for the specific situation.

6.2 Results

With respect to the findings obtained from the expert interviews, results are structured according to 14 codes used for categorizing the data collected in the interviews. All interviewees identified various possibilities to apply the framework in business contexts, such as exploiting cross-selling opportunities, offering individually adapted after-sales services and managing time at the car dealership. Moreover, customer treatment should diverge between different segments, so prioritized customers might be provided with preferential appointments by the most professional staff members. One of the key findings was the necessity of implementing the framework as an IT solution and link this to the data of the corporate CRM systems. The supportive pieces of information should be visualized on desktop PCs and tablets of the service staff. With respect to the visual layout, colours were proposed to emphasize and differentiate customers' profitability and expectations. Consumer data required for assigning customers to segments was proposed to be collected via two approaches: First, customers' behaviour should be observed on-site during their stay at the car dealership. This could be achieved by service advisors interpreting the consumers' mind-sets and desires in direct conversations. Second, a system of incentives for customers could be implemented, including price discounts or gift baskets for participating in online surveys. Thereby, personal preferences could be detected and transferred into the IT systems, fine-tuning or updating the allocation to a certain segment. Some of the respondents considered the implemented framework to be flexible by keeping data up-to-date in fixed time intervals, depending on the frequency of customer visits. Moreover, the IT solution need to be easy to use, so unnecessary details should be neglected, as stated by four experts.

Beneficial implications through utilization are assumed to be: Increase of turnover, enhanced customer satisfaction and individualization of service offerings. Also, several aspects were pointed out potentially limiting the significance of the framework, as appropriateness of proposed service offerings might diverge according to the customer's mood. Moreover, the framework could be modified to consider information about personal networks when clustering customers into groups (e.g. inconsistent treatment of family members due to diverging segments).

The concept of segmentation was stated to be of high strategic relevance in the automotive after-sales sector and yet hardly any frameworks have been successfully utilized in this area. Thus, one of the

strategic tasks was to provide incentives for the operational usage of a framework and different forms of training for service advisors.

The persona interviews revealed that the theoretical values derived from literature frequently diverged from the interviewees statements. In most cases, customer expectations turned out to be higher compared to their actual segment specification. Furthermore, customer groups were more alike than expected and behave differently in diverse occasions at the car dealership, impeding predictability and a priori segmentation.

The interviews confirmed the assumption that fulfilling customer specific service demands will have a positive impact on their loyalty and satisfaction, as well as recommendation to friends and family. Unfulfilled customer needs are likely to provoke the opposite reaction.

6.3 Discussion

In general, the expert interviews confirmed the high relevance of customer segmentation as well as the need for a conceptual framework, in accordance with previous literature. However, the respondents' proposals of allocating customers to certain segments (on-site observation by the service advisor and online surveys) lack profoundness and accuracy. The challenging nature of this task is also implied by the emerging gap between customer expectations defined in theory and the results of the persona interviews. Moreover, once assigned to a segment, customer data are to be kept up-to-date in the implemented framework and the validity is to be reviewed regularly.

Extensive and steady data customer collection turned out to be a critical challenge for the concept's applicability in the business context, which could not be met by the qualitative evaluation in this paper. Therefore, alternative approaches must be applied for assigning customers to the conceptually defined segments. A possible solution could be the simultaneous combination of a top-down and bottom-up approach for data collection. With respect to the top-down procedure, extensive market research provides the base for identifying the customers' needs. As proposed by Dibb and Simkin (1991), consumers are classified according to "Basic Customer Characteristics" like demographics and socioeconomics as well as "Product-related Behavioral Characteristics" such as purchase behavior and attitude towards the product. By means of these insights, customers could then be mapped to the segments of the proposed framework. Regarding the bottom-up approach, common data mining techniques for clustering and RFM analysis could be applied, as described in the literature review, using existing customer data from CRM systems. The respondents' data collection proposals made in this study could be used as an optional supplement, strengthening the personal relationship between car dealers and customers.

7 Limitations and Further Research

With respect to the expert interviews, all experts belong to the same company, likewise all manufacturer representatives are employed by the same OEM. The current framework is just a prototype and needs to be tested under real conditions in the field. In terms of the persona interviews, only one respondent per customer group was chosen as representative. So, the validity of the six customer segments should be tested by a quantitative analysis to increase representative nature. Moreover, attitudes of business customers may be investigated to reveal possible deviations.

Future research would benefit from an extension of the framework to include generally observable variables of customers to check whether patterns between geographic, demographic and socio-economic features exist. Moreover, more data from a larger number of interviewees needs to be collected and analyzed in further case studies,. This could increase the framework's applicability to domains other than the German automotive aftersales field. In general, a more encompassing approach to data collection is required to assign customers to the respective segments. Thus, a top-down market research could be combined with bottom-up data mining techniques.

The proposed framework was developed within the scope of automotive after-sales in Germany. The evaluation was performed by interviewing stakeholders only from Germany, and the specification of segments was based on two German automotive customer studies. However, it is likely that the results could be applicable in other markets than Germany, too, since the processes of automotive aftersales are similar on a global level, as pointed out by Sabbagha et al. (2016). With respect to industries other than the automotive sector, the framework's general three-dimensional approach could be partially applied by keeping the customer dimension but replacing the vehicle and occasion dimension with the respective categories.

8 Conclusion

A meaningful segmentation concept is considered indispensable in the automotive after-sales business, due to the strategic relevance for OEMs and car dealerships. With regard to implications for the sector in Germany, the flexibility of modern lifestyles requires continuous reflection about appropriate customer treatment. Data is to be maintained and kept up-to-date, as increasing individualization and inconstancy of customers leads to potential brand and dealership disloyalty in case of unfulfilled demands. A shift from vehicle to customer centricity is required in the industry to set a new standard for the treatment of customers and create superior experiences and customer loyalty. The concepts of segmentation and individualization are compatible without contradiction.

This study provides a framework to segment the customer base in a way useful for operational purposes (i.e. intuitively understandable) but also generates a segment-of-one feeling for the individual customer by including the occasion of the customer's visit as an additional dimension. While upcoming IT systems will provide the data and capabilities for more sophisticated customer segmentation approaches like the proposed one, it became apparent that the user interface needs to be designed in a visualized way, i.e. using graphics to display data in a dashboard-like way (part of further developments).

Results of the customer expectations analysis reveal that preferences are diverse and differ according to various occasions, making them hard to predict. The proposed framework with its multidimensional structure attempts to capture these multifaceted characteristics and offers the possibility to reduce the original 2,916 customer segments to a limited extend to 6 typical customer groups. However, in this way customers are grouped according to their profitability and expectations instead of truly focusing on every individual. Nevertheless, the proposed framework provides a tool to reduce the customer complexity significantly in comparison to a full segment-of-one approach, while still generating a segment-of-one feeling for the customer.

References

Abirami, M. and Pattabiraman, V. (2016) 'Data Mining Approach for Intelligent Customer Behavior Analysis for a Retail Store', in Vijayakumar, V. and Neelanarayanan, V. (eds) Proceedings of the 3rd International Symposium on Big Data and Cloud Computing Challenges (ISBCC – 16'), Cham, Springer International Publishing, pp. 283–291.

Alborzi, M. and Khanbabaei, M. (2016) 'Using data mining and neural networks techniques to propose a new hybrid customer behaviour analysis and credit scoring model in banking services based on a developed RFM analysis method', International Journal of Business Information Systems, vol. 23, no. 1, p. 1.

Arndt, D. and Langbein, N. (2002) 'Data Quality in The Context of Customer Segmentation', DaimlerChrysler AG [Online]. Available at http://ssm-vm030.mit.edu/ICIQ/Documents/IQ%20Conference%202002/Papers/DataQualityinTheContextofCustomerSegmentation.pdf (Accessed 1 May 2015).

Athanassopoulos, A. D. (2000) 'Customer Satisfaction Cues To Support Market Segmentation and Explain Switching Behavior', Journal of Business Research, vol. 47, no. 3, pp. 191–207.

Barone, G. and Bella, M. (2004) 'Price-elasticity based customer segmentation in the Italian auto insurance market', Journal of Targeting, Measurement and Analysis for Marketing, vol. 13, no. 1, pp. 21–31.

Bloemer, J. M. and Lemmink, J. G. (1992) 'The importance of customer satisfaction in explaining brand and dealer loyalty', Journal of Marketing Management, vol. 8, no. 4, pp. 351–363.

Brachat, H. (2012) 'Autohaus-Management', in Diez, W., Reindl, S. and Brachat, H. (eds) Grundlagen der Automobilwirtschaft: Das Standardwerk der Automobilbranche, 5th edn, München, Autohaus Buch & Formular; Springer Automotive Media, pp. 151–200.

Brandenburg, E. (2012) 'Der Servicemarkt in der Automobilwirtschaft (Wartungs- und Reparaturgeschäft)', in Hecker, F., Hurth, J. and Seeba, H.-G. (eds) After-sales in der Automobilwirtschaft: Konzepte für Ihren Erfolg, 2nd edn, München; Springer Automotive Media, pp. 13–45.

Chen, Y., Zhang, G., Hu, D. and Fu, C. (2007) 'Customer segmentation based on survival character', Journal of Intelligent Manufacturing, vol. 18, no. 4, pp. 513–517.

Darley, W. K., Luethge, D. J. and Thatte, A. (2008) 'Exploring the relationship of perceived automotive salesperson attributes, customer satisfaction and intentions to automotive service department patronage: The moderating role of customer gender', Journal of Retailing and Consumer Services, vol. 15, no. 6, pp. 469–479.

Datta, Y. (1996) 'Market segmentation: an integrated framework', Long Range Planning, vol. 29, no. 6, pp. 797–811.

Dibb, S. and Simkin, L. (1991) 'TARGETING, SEGMENTS AND POSITIONING', International Journal of Retail & Distribution Management, vol. 19, no. 3.

Fogliatto, F. S., da Silveira, Giovani J.C. and Borenstein, D. (2012) 'The mass customization decade: An updated review of the literature', International Journal of Production Economics, vol. 138, no. 1, pp. 14–25.

Fowler, D., Pitta, D. and Leventhal, R. C. (2013) 'Technological advancements and social challenges for one-to-one marketing', Journal of Consumer Marketing, vol. 30, no. 6, pp. 509–516.

Füller, J. and Matzler, K. (2008) 'Customer delight and market segmentation: An application of the three-factor theory of customer satisfaction on life style groups', Tourism Management, vol. 29, no. 1, pp. 116–126.

Galal, M.; Hassan, G. and Aref, M. (2016) 'Developing a Personalized Multi-Dimensional Framework using Business Intelligence Techniques in Banking', The 10th International Conference on Informatics and Systems. Cairo, Egypt, pp. 21–27.

GIK (2014) b4p - best for planning, Gesellschaft für integrierte Kommunikationsforschung mbH & Co. KG [Online]. Available at http://www.b4p.de/fileadmin/b4p/upload/insights/download/Berichtsband_englisch_November_2014.zip.

Gilmour, P., Borg, G., Duffy, P. A., Johnston, N. D., Limbek, B. E. and Shaw, M. R. (1982) 'Customer Service: Differentiating by Market Segment', International Journal of Physical Distribution & Materials Management, vol. 12, no. 3, pp. 37–44.

Godlevskaja, O., van Iwaarden, J. and van der Wiele, T. (2011) 'Moving from product-based to service-based business strategies: Services categorisation schemes for the automotive industry', International Journal of Quality & Reliability Management, vol. 28, no. 1, pp. 62–94.

Gorenstein, A. K. (2001) System and Method for Composite Customer Segmentation, US US7035811 B2.

Green, P. E. (1977) 'A new approach to market segmentation', Business Horizons, vol. 20, no. 1, pp. 61–73.

Green, P. E. and Krieger, A. M. (1991) 'Segmenting Markets with Conjoint Analysis', Journal of Marketing, vol. 55, no. 4, pp. 20–31.

Haenlein, M., Kaplan, A. M. and Beeser, A. J. (2007) 'A Model to Determine Customer Lifetime Value in a Retail Banking Context', European Management Journal, vol. 25, no. 3, pp. 221–234.

Hamka, F., Bouwman, H., Reuver, M. de and Kroesen, M. (2014) 'Mobile customer segmentation based on smartphone measurement', Telematics and Informatics, vol. 31, no. 2, pp. 220–227.

Han, S. H., Lu, S. X. and Leung, S. C. (2012) 'Segmentation of telecom customers based on customer value by decision tree model', Expert Systems with Applications, vol. 39, no. 4, pp. 3964–3973.

Hevner, A. R.; March, S. T.; Park, J. and Ram, S. (2004). Design science in information systems research, MIS quarterly 28 : 75-105.

Hiziroglu, A. (2013) 'Soft computing applications in customer segmentation: State-of-art review and critique', Expert Systems with Applications, vol. 40, no. 16, pp. 6491–6507.

Huerta-Muñoz, D. L.; Ríos-Mercado, R. Z. and Ruiz, R. (2017) 'An iterated greedy heuristic for a market segmentation problem with multiple attributes', European Journal of Operational Research, vol. 261, no. 1, pp. 75–87.

Hultén, B. (2007) 'Customer segmentation: The concepts of trust, commitment and relationships', Journal of Targeting, Measurement and Analysis for Marketing, vol. 15, no. 4, pp. 256–269.

Ieva, M. and Ziliani, C. (2017) 'Towards digital loyalty programs: Insights from customer medium preference segmentation', International Journal of Retail & Distribution Management, vol. 45, no. 2, pp. 195–210.

Jonker, J.-J., Piersma, N. and Van den Poel, D. (2004) 'Joint optimization of customer segmentation and marketing policy to maximize long-term profitability', Expert Systems with Applications, vol. 27, no. 2, pp. 159–168.

Jutla, D., Craig, J., and Bodorik, P. (2001) 'Enabling and measuring electronic customer relationship management readiness', Proceedings of the 34th annual hawaii international conference on system sciences organizational systems and technologies track, pp. 1–10.

Khajvand, M. and Tarokh, M. J. (2011) 'Estimating customer future value of different customer segments based on adapted RFM model in retail banking context', Procedia Computer Science, vol. 3, pp. 1327–1332.

Kim, S.-Y., Jung, T.-S., Suh, E.-H. and Hwang, H.-S. (2006) 'Customer segmentation and strategy development based on customer lifetime value: A case study', Expert Systems with Applications, vol. 31, no. 1, pp. 101–107.

Kleimann, P. G., Posdorf, D., Brenner, A., Beyer, S., Kiene, R. and Hunstock, T. (2013) Maßkonfenktion im After-sales: Servicedifferenzierung entlang der Kundenwünsche, Roland Berger Strategy Consultants GmbH [Online]. Available at http://www.rolandberger.com/media/pdf/Roland_Berger_Customizing_after-sales_20131120.pdf (Accessed 30 May 2016).

Kotler, P. (1989) 'From mass marketing to mass customization', Planning Review, vol. 17, no. 5, pp. 10–47.

Koudehi, F. A., Rajeh, S. M., Farazmand, R. and Seyedhosseini, S. M. (2014) 'A hybrid segmentation approach for customer value', Interdisciplinary Journal of Contemporary Research in Business, vol. 6, no. 6, pp. 142–152 [Online]. Available at http://euabr.com/ijcrboct14/142-152oct14.pdf (Accessed 1 May 2015).

Kuo, R. J.; Mei, C. H.; Zulvia, F. E. and Tsai, C. Y. (2016) 'An application of a metaheuristic algorithm-based clustering ensemble method to APP customer segmentation', Neurocomputing, vol. 205, pp. 116–129.

Liang, Y.-H. (2010) 'Integration of data mining technologies to analyze customer value for the automotive maintenance industry', Expert Systems with Applications, vol. 37, no. 12, pp. 7489–7496.

McKee, D. O., Varadarajan, P. R. and Pride, W. M. (1989) 'Strategic Adaptability and Firm Performance: A Market-Contingent Perspective', Journal of Marketing, vol. 53, no. 3, pp. 21–35.

Melnic, E. L. (2016) 'How to strengthen customer loyalty, using customer segmentation?', Bulletin of the Transilvania University of Brasov, Economic Sciences, vol. 9.2, no. 58.

Odekerken-Schröder, G., Ouwersloot, H., Lemmink, J. and Semeijn, J. (2003) 'Consumers' trade-off between relationship, service package and price: An empirical study in the car industry', European Journal of Marketing, vol. 37, 1/2, pp. 219–242.

Oerder, S. and Wegerer, C. (2014) Einer für alles?! (Serviceberater-Studie 2014): Der moderne Serviceberater im Spannungsfeld zwischen Kundenanspruch und Profitabilität, AUTOHAUS and NTT DATA Deutschland GmbH [Online]. Available at http://www.springer-automotive-shop.de/shop/studien/einer-fuer-alles-der-moderne-serviceberater.html (Accessed 7 April 2016).

Palmer, R. A. and Millier, P. (2004) 'Segmentation: Identification, intuition, and implementation', Industrial Marketing Management, vol. 33, no. 8, pp. 779–785.

Payne, A. and Frow, P. (2005) 'A Strategic Framework for Customer Relationship Management', Journal of Marketing, vol. 69, no. 4, pp. 167–176.

Peker, S.; Kocyigit, A. and Eren, E. P. (2017) 'LRFMP model for customer segmentation in the grocery retail industry: A case study', Marketing Intelligence & Planning, vol. 35, no. 4.

Qiasi, R., baqeri-Dehnavi, M., Minaei-Bidgoli, B. and Amooee, G. (2012) 'Developing a model for measuring customer's loyalty and value with RFM technique and clustering algorithms', The Journal of Mathematics and Computer Science, vol. 4, no. 2, pp. 172–181.

Sabbagha, O., Ab Rahman, M. N., Ismail, W. R., and Hussain, W. M. H. W. (2016) 'Impact of Quality Management Systems and After-sales Key Performance Indicators on Automotive Industry: A Literature Review', Procedia-Social and Behavioral Sciences, vol. 224, pp. 68-75.

Sausen, K., Tomczak, T. and Herrmann, A. (2005) 'Development of a taxonomy of strategic market segmentation: a framework for bridging the implementation gap between normative segmentation and business practice', Journal of Strategic Marketing, vol. 13, no. 3, pp. 151–173.

Simonson, I. (2005) 'Determinants of Customers' Responses to Customized Offers: Conceptual Framework and Research Propositions', Journal of Marketing, vol. 69, no. 1, pp. 32–45.

Singh, I. and Singh, S. (2017) 'Framework for Targeting High Value Customers and Potential Churn Customers in Telecom using Big Data Analytics', International Journal of Education and Management Engineering, vol. 7, no. 1, pp. 36–45.

Steenkamp, J.-B. E. and Hofstede, F. T. (2002) 'International market segmentation: issues and perspectives', International Journal of Research in Marketing, vol. 19, no. 3, pp. 185–213.

Stone, M., Woodcock, N. and Wilson, M. (1996) 'Managing the change from marketing planning to customer relationship management', Long Range Planning, vol. 29, pp. 675–683.

Tkáč, M. and Verner, R. (2016) 'Artificial neural networks in business: Two decades of research', Applied Soft Computing, vol. 38, pp. 788–804.

Tsai, C.-F., Hu, Y.-H. and Lu, Y.-H. (2015) 'Customer segmentation issues and strategies for an automobile dealership with two clustering techniques', Expert Systems, vol. 32, no. 1, pp. 65–76.

Verstrepen, S., Deschoolmeester, D. and Van den Berg, Roelof J. (1999) 'Servitization in the automotive sector: creating value and competitive advantage through service after sales', IFIP — The International Federation for Information Processing, vol. 24, no. 1, pp. 538–545

Vorhies, D. W., Harker, M. and Rao, C. P. (1999) 'The capabilities and performance advantages of market-driven firms', European Journal of Marketing, vol. 33, 11/12, pp. 1171–1202.

Wedel, M. and Kamakura, W. A. (1998) Market segmentation: Conceptual and methodological foundations, Boston, Kluwer Academic.

Wedel, M. and Kamakura, W. A. (2000) Market Segmentation: Conceptual and Methodological Foundations, Boston, MA, Springer US.

Wedel, M. and Kamakura, W. A. (2002) 'Introduction to the Special Issue on Market Segmentation', International Journal of Research in Marketing, vol. 19, pp. 181–183.

Wind, Y. and Cardozo, R. N. (1974) 'Industrial market segmentation', Industrial Marketing Management, vol. 3, no. 3, pp. 153–165.

Wind, Y. (1978) 'Issues and Advances in Segmentation Research', Journal of Marketing Research, vol. 15, no. 3, pp. 317–337

Yin, R. K. (2011) Qualitative research from start to finish, New York, The Guilford Press.

Zeithaml, V. A., Rust, R. T. and Lemon, K. N. (2001) 'The customer pyramid: Creating and serving profitable customers', California Management Review, vol. 43, no. 4, pp. 1–20