

Chapter 2

Market Segmentation Analysis



2.1 The Layers of Market Segmentation Analysis

Market segmentation analysis, at its core (see Fig. 2.1), is

the process of grouping consumers into naturally existing or artificially created segments of consumers who share similar product preferences or characteristics.

This process is typically a statistical one. Yet, it is exploratory in nature. Many decisions made by the data analyst in the process of extracting market segments from consumer data affect the final market segmentation solution. For market segmentation analysis to be useful to an organisation, therefore, both a competent data analyst, and a user who understands the broader mission of the organisation (or that of their organisational unit when working in a team) need to be involved when market segments are extracted from consumer data. Throughout this book, we use the term *user* to mean the user of the segmentation analysis; the person or department in the organisation that will use the results from the market segmentation analysis to develop a marketing plan.

To ensure that the grouping of consumers is of the highest quality, a number of additional tasks are required, as illustrated in the second layer in Fig. 2.1. All these tasks are still primarily technical in nature. Collecting good data, for example, is critically important. The statistical segment extraction process at the core of market segmentation analysis cannot compensate for bad data. The grouping of consumers can always only be as good as the data provided to the segment extraction method.

Upon completion of data collection, but before the actual segment extraction takes place, the data needs to be explored to gain preliminary insight into the nature of the market segmentation study that can be conducted using this data. Finally, after consumers have been grouped into market segments, each of these segments needs to be profiled and described in detail. Profiling and describing segments help users

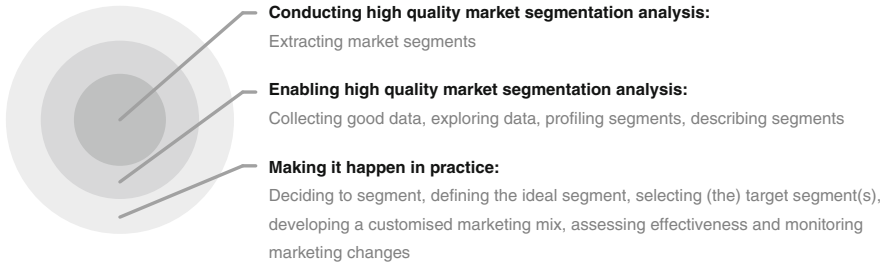


Fig. 2.1 The layers of market segmentation analysis

to understand each of the segments, and select which one(s) to target. When one or more target segments have been chosen, profiling and describing segments inform the development of the customised marketing mix.

If all the tasks in the first (core) and second layer of market segmentation analysis have been implemented well, the result is a theoretically excellent market segmentation solution. But a theoretically excellent market segmentation solution is meaningless unless users can convert such a solution into strategic marketing decisions and tactical marketing action. Therefore, for any market segmentation analysis to be complete, a third layer is required. This third layer includes non-technical tasks. These tasks represent organisational implementation issues, and do not sequentially follow the first and the second layer. As illustrated in Fig. 2.1, the third layer of implementation tasks wraps around technical tasks.

Before any technical tasks are undertaken, an organisation needs to assess whether, in their particular case, implementing a market segmentation strategy will lead to market opportunities otherwise unavailable to them. If the market segmentation analysis points to such opportunities, the organisation must be willing to commit to this long-term strategy. All of these decisions have to be made by the users, and are entirely independent of the technical task of extracting market segments from data.

User input is also critically important at the data collection stage to ensure that relevant information about consumers will be captured. Again, this is not a decision a data analyst can make.

Upon completion of the segment extraction task, users need to assess resulting market segments or market segmentation solutions, and select one or more target segments. Data analysts can provide facts about these segments, but cannot select the most suitable ones. This selection is driven, in part, by the strengths and opportunities of the organisation, and their alignment with the key needs of the market segments. Finally, as soon as one or more target segments have been selected, users need to develop a marketing plan for those market segments, and design a customised marketing mix.

2.2 Approaches to Market Segmentation Analysis

No one single approach is best when conducting market segmentation analysis. Instead, approaches to market segmentation analysis can be systematised in a number of different ways. We present two systematics here, one uses as its basis the extent to which the organisation conducting the market segmentation study is willing or able to make changes to their current approach of targeting the market or a segment of the market and has been proposed by Dibb and Simkin (2008). It is based on the premise that organisations are not in the position to choose any of the available approaches to market segmentation analysis due to organisational constraints. The second systematics is based on the nature of the segmentation variable or variables used in the market segmentation analysis.

2.2.1 *Based on Organisational Constraints*

Dibb and Simkin (2008) distinguish three approaches to market segmentation: the quantitative survey-based approach, the creation of segments from existing consumer classifications, and the emergence of segments from qualitative research. These three approaches differ in how radical the resulting change is for the organisation. We refer to the approach requiring the most radical change in the organisation as *segment revolution*. It is like jumping on a sandcastle and building a new one. It starts from zero. A less radical approach is that of *segment evolution*, which is like refining an existing sandcastle. As long as the sandcastle is robust, and not too close to the water, this is a perfectly reasonable approach. The least radical approach is not really even a segmentation approach, it is like walking down the beach and seeing a huge pile of sand and thinking: this would make a fantastic sandcastle. It is a random discovery, like a *mutation*, which – if noticed and acted upon – also has the potential of allowing the organisation to harvest the benefits of market segmentation.

Looking at each one of these approaches in more detail, the *segment revolution* or *quantitative survey-based segmentation approach* tends to be seen as the prototypical market segmentation analysis. The key assumption underlying this approach is that the organisation conducting market segmentation analysis is willing and able to start from scratch; to forget entirely about how its marketing was conducted in the past, and commence the segmentation process with a genuinely open mind. If market segmentation analysis reveals a promising niche segment, or a promising set of market segments to target with a differentiated market strategy, the organisation must develop an entirely new marketing plan in view of those findings.

While this approach is indeed a textbook approach in terms of having the highest probability of harvesting all the benefits market segmentation strategy has to offer, it is often not viable in reality. Possible reasons include the unwillingness or inability of an organisation to change sufficiently, or the use of established segments

performing reasonably well. In such cases, market segmentation analysis does not have to be abandoned altogether. Other, less radical approaches are available, including that of *creating segments from currently targeted sectors and segments*. This approach – representing segment evolution rather than revolution – is one of refining and sharpening segment focus. While informed by data and possibly also market research, it is typically achieved by intra-organisational workshopping. Dibb and Simkin (2008) offer a proforma to guide organisations through this process.

The third approach is that of *exploratory research pointing to segments*. Under this approach, market segments are stumbled upon as part of an exploratory research process possibly being undertaken for a very different purpose initially. In times of big data, such segment mutation may well result from data mining of streams of data, rather than from qualitative research. The same holds for segment evolution. The continuous tracking of the nature of market segments in large streams of data flowing in on a continuous basis can be used to check on an ongoing basis whether market structure has changed in ways which make it necessary to adapt the segmentation strategy to ensure organisational survival and prosperity.

2.2.2 Based on the Choice of (the) Segmentation Variable(s)

A more technical way of systematising segmentation approaches is to use as a basis the nature of consumer characteristics used to extract market segments. Sometimes one single piece of information about consumers (one segmentation variable) is used. This statistical problem is unidimensional. One example is age. The resulting segments are age groups, and older consumers could be selected as a target segment.

In other cases, multiple pieces of information (multiple segmentation variables) about consumers are important. In this case, the statistical problem becomes multidimensional. One example could be consumers' expenditure patterns. An expenditure pattern underlying a market segmentation analysis could be the total dollars spent on ten different vacation activities, including entrance fees to theme parks, dining out, shopping and so on. Imagine that a tourist destination known for its man-made attractions is trying to identify a suitable target market. Using tourists' expenditure patterns could be useful in this context, helping the destination focus on those tourists who have in the past spent a lot of money on entrance fees for theme parks and zoos. It is reasonable to expect that this past expenditure pattern is predictive of future expenditures. If these tourists can be attracted to the destination, they are likely to make extensive use of the man-made attractions on offer. A few examples of commonly used segmentation variables are provided in Table 2.1.

When one single segmentation variable is used, the segmentation approach is referred to as *a priori* (Mazanec 2000), *convenience-group* (Lilien and Rangaswamy 2003) or *commonsense* market segmentation (Dolnicar 2004). Morritt (2007) describes this approach to market segmentation as one that is created without the benefit of primary market research. Managerial intuition, analysis of secondary data sources, analysis of internal consumer databases, and previously existing segments

Table 2.1 Examples of commonly used segmentation variables

Variable	Dimensions	Sample survey question
Age	Unidimensional	How old are you?
Gender	Unidimensional	Are you female or male?
Country of origin	Unidimensional	Where do you live?
Prior purchase	Unidimensional	Have you booked a cruise trip before?
Benefits sought	Multidimensional	When booking flights online, do you care about <ul style="list-style-type: none"> • convenience • value for money • speed • ability to compare fares
Motives	Multidimensional	When choosing a vacation, do you want to <ul style="list-style-type: none"> • rest and relax • explore new things • meet new people • learn about other cultures • get away from everyday routine

are used to group consumers into different segments (p. 9). The term *a priori segmentation* indicates that the decision about what characterises each segment is made in advance, before any data analysis is conducted. The term *commonsense segmentation* implies that users apply their common sense to choose their target segment. The term *convenience-group segmentation* indicates that the market segments are chosen for the convenience of serving them. When commonsense segmentation is conducted, the provider of the product usually has a reasonably good idea of the nature of the appropriate segment or segments to target. The aim of the segmentation analysis therefore is not to identify the key defining characteristic of the segment, but to gain deeper insight into the nature of the segments.

An example of commonsense segmentation is brand segmentation. Hammond et al. (1996) show in their study that consumers who purchase specific brands do not have distinct profiles with respect to descriptor variables. Of course, this does not hold for all commonsense segmentations. On the contrary: if a powerful segmentation variable is identified, which is reflective of some aspect of purchase behaviour, commonsense segmentation represents a very efficient approach because it is simpler and fewer mistakes can occur in the process of a commonsense market segmentation analysis. Lilien and Rangaswamy (2003) view this kind of market segmentation approach as reactive.

The proactive approach, which exploits multiple segmentation variables, is referred to as *a posteriori* (Mazanec 2000), *cluster based* (Wind 1978; Green 1977) or *post hoc* segmentation (Myers and Tauber 1977). These terms indicate that the nature of the resulting market segments is not known until after the data analysis has been conducted. An alternative term used is that of *data-driven* segmentation (Dolnicar 2004). This term implies that the segmentation solution is

determined through data analysis, that data analysis creates the solution. Morrith (2007) identifies the key characteristic of this approach as being based on primary (original) research into the preferences and purchase behaviour of your target market (p. 9).

When data-driven segmentation is conducted, the organisation has certain assumptions about the consumer characteristics that are critical to identifying a suitable market segment to target, but does not know the exact profiles of suitable target segments. The aim of data-driven segmentation, therefore, is twofold: first, to explore different market segments that can be extracted using the segmentation variables chosen, and, second, to develop a detailed profile and description of the segment(s) selected for targeting.

Commonsense and data-driven segmentation are two extremes, the two pure forms of segmentation approaches based on the nature of the segmentation criterion. In reality, market segmentation studies rarely fall into one of those clear-cut categories. Rather, various combinations of those approaches are used either sequentially or simultaneously, as can be seen in Table 2.2.

Commonsense/commonsense segmentation results from splitting consumers up into groups using one segmentation variable first. Then, one of the resulting segments is selected and split up further using a second segmentation variable. At the other extreme, data-driven/data-driven segmentation is the result of combining two sets of segmentation variables. Table 2.2 provides a few examples.

Morrith (2007) recommends the use of such combinations of segmentation variables in market segmentation analysis, which he refers to as *two-stage, or multi-stage segmentation*. An example of such a multi-stage segmentation is provided by Boksberger and Laesser (2009) who use a set of travel motives as the segmentation variables for data-driven segmentation after having pre-selected senior travellers using a commonsense segmentation approach.

2.3 Data Structure and Data-Driven Market Segmentation Approaches

When conducting data-driven market segmentation, data analysts and users of market segmentation solutions often assume that market segments naturally exist in the data. Such naturally occurring segments, it is assumed, need to merely be revealed and described. In real consumer data, naturally existing, distinct and well-separated market segments rarely exist.

This leads to the question: should market segments be extracted if they do not naturally exist in the data? Dubes and Jain (1979, p. 242) answer this question in the context of cluster validation: it is certainly foolish to impose a clustering structure on data known to be random. Their view was largely shared by the pioneers of market segmentation (Frank et al. 1972; Myers and Tauber 1977) who worked on the assumption that taxonomic procedures describe natural groups present in

Table 2.2 Combinations of segmentation approaches based on the nature of segmentation variables used. (Modified from Dolnicar 2004)

	Commonsense/ commonsense segmentation	Commonsense/ data-driven segmentation	Data-driven/ commonsense segmentation	Data-driven/ data-driven segmentation
Primary segmentation variable(s)	Commonsense (e.g. age, country of origin)	Commonsense (e.g. age, country of origin)	Data-driven (e.g. expenditures, vacation activities)	Data-driven (e.g. travel motives, expenditures)
Secondary segmentation variable(s)	Commonsense (e.g. gender, seeking adventure or not)	Data-driven (e.g. travel motives, vacation activities)	Commonsense (e.g. gender, family status)	Data-driven (e.g. vacation activities, information sources used)
Example 1	Young female tourists	Mature aged tourists who play golf, enjoy wine-tastings and fine dining	Tourists who engage in a large number of activities that attract an entrance fee, such as visiting theme parks and zoos, and who travel with their family	Tourists who want to learn about culture and local people, and who attend local cultural events and food festivals
Example 2	Adventure travellers from Australia	Older tourists who take a holiday to relax, have a change of usual surroundings, and enjoy health / beauty treatments	Tourists who surf and enjoy the night life of the destination, and who are male	Tourists who have high expenditures in a wide range of expenditure categories at the destination, and use airline loyalty program mail outs as their key travel information source

empirical data. Myers and Tauber (1977, p. 71) explicitly state that the aim of market segmentation is to search for ‘natural groupings’ of objects and define market segments as clearly defined natural groupings of people.

More recently, however, acceptance of the fact that empirical data sets typically used for the purpose of market segmentation do not display much cluster structure, has led to a modified view: Mazanec (1997) and Wedel and Kamakura (2000) argue that market segmentation is in fact the process of creating artificial segments that can help users develop more effective marketing strategies. The value of this position has been acknowledged in the early works on market segmentation, despite the fact that the authors of those early studies still aimed at identifying natural segments. Myers and Tauber (1977, p. 74), for example, show an empirical data set which

does not contain natural market segments and ask: Does this mean that there are no actionable segments? Myers and Tauber (1977) then proceed by answering that this is not necessarily the case. Rather, as long as market segments can be created from the empirical data in a way that makes members of the segment similar, while at the same time being distinctly different from other consumers, they may well be of value to an organisation.

Dolnicar and Leisch (2010) distinguish three possible conceptual approaches to data-driven market segmentation: natural, reproducible or constructive segmentation (Table 2.3).

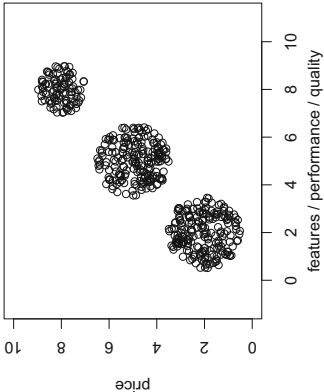
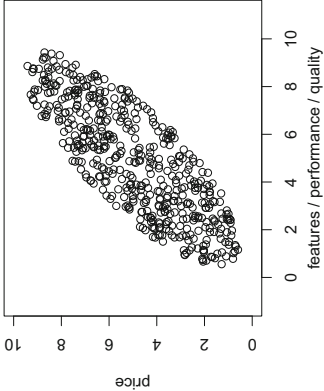
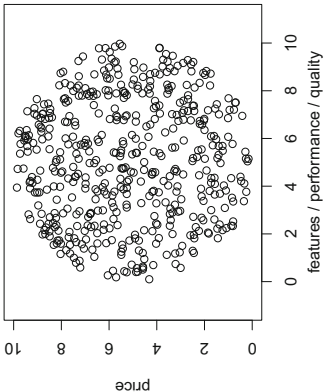
The term *natural segmentation* reflects the traditional view that distinct market segments exist in the data, and that the aim of market segmentation analysis is to find them. This traditional view is reflected well in the statement that the initial premise in segmenting a market is that segments actually do exist (Beane and Ennis 1987, p. 20).

The term *reproducible segmentation* refers to the case where natural market segments do not exist in the data. But the data are not entirely unstructured either. Rather, the data contain some structure – other than cluster structure – making it possible to generate the same segmentation solution repeatedly. The ability to repeatedly reveal the same or very similar market segments, makes results of data-driven segmentation studies less random and more reliable. Reliable results represent a stronger basis for long-term strategic segmentation decisions.

Finally, the term *constructive segmentation* refers to the case where neither cluster structure nor any other data structure exists, which would enable the data analyst to reproduce similar segmentation solutions repeatedly across replications. At first the question arises: should such data be segmented at all? Are segments resulting from such data sets managerially useful? After all they are merely random creations of the data analyst. The answer is: yes. It does make sense to conduct constructive market segmentation because, even if consumer preferences are spread evenly across all possible combinations of attributes, it is still more promising to target subgroups of these consumers (for example, those who like to have many functions on the mobile phone despite a higher price) than to attempt to satisfy the entire range of consumer needs.

The problem is: at the beginning of a market segmentation analysis it is not known whether the empirical data permits natural segmentation, or whether it requires constructive segmentation. Ernst and Dolnicar (2018) provide a rough estimate of the frequency of occurrence of each one of those concepts by classifying 32 empirical tourism survey data sets. These data sets varied greatly in sample size, response formats offered to survey participants, and the nature of the constructs. Results suggest that natural segmentation is extremely rare. Only two data sets (6% of the data sets investigated) contained natural market segments. This finding has major implications: it points to the fact that it is absolutely essential to conduct data structure analysis (see Sect. 7.5) before extracting segments. Results also suggest

Table 2.3 Data-driven market segmentation approaches based on data structure. (Modified from Dolnicar and Leisch 2010)

Natural segmentation	Reproducible segmentation	Constructive segmentation
Cluster structure in the data	Structure in the data, but not cluster structure	No structure in the data
Market segments are revealed	Market segments are created	Market segments are created
Repeated calculations lead to very similar results (very stable across repeated calculations)	Repeated calculations lead to similar results (reasonably stable across repeated calculations)	Repeated calculations lead to different results (unstable across repeated calculations)
<p>Example data:</p> 	<p>Example data:</p> 	<p>Example data:</p> 

that the worst case scenario – the entire lack of data structure – occurs in only 22% of cases. Nearly three quarters of data sets analysed contain some structure – other than cluster structure – which can be exploited to extract market segments re-occurring across repeated calculations.

The proposed conceptualisation, as well as previous empirical estimates of the frequency of occurrence of each of those concepts, indicate that conducting data structure analysis in advance of the actual data-driven market segmentation analysis is a good idea. This is comparable to driving a car in a new city following a navigation system or looking at the map first, to get a feeling for the lay of the land, then planning the route and driving. Data structure analysis achieves a similar aim: it provides an overall picture of the data, which helps to avoid bad methodological decisions and misinterpretations when segmenting the data. A simple way of getting a feeling for the structure of the data, is to repeatedly segment it with different numbers of segments and different algorithms. An automated approach – using stability of repeated segmentation solutions as a criterion – is proposed by Dolnicar and Leisch (2010) and will be discussed in detail in Sect. 7.5. Whichever approach the data analyst chooses, it will provide insight as to the concept of market segmentation study that can be implemented. In the case of natural clustering, the data analyst needs little input from users because the solution is obvious. At the other extreme, when data are entirely unstructured, the data analyst must work hand in hand with users of the market segmentation solution to construct the most strategically useful market segments.

2.4 Market Segmentation Analysis Step-by-Step

We recommend a ten-step approach to market segmentation analysis. Figure 2.2 illustrates the ten steps. The basic structure is the same for both commonsense and data-driven market segmentation: an organisation needs to weigh up the advantages and disadvantages of pursuing a segmentation strategy, and decide whether or not to go ahead (Step 1). Next, the organisation needs to specify characteristics of their ideal market segment (Step 2). Only after this preliminary and predominantly conceptual work is finalised, is empirical data collected or compiled from existing sources (Step 3). These data need to be explored (Step 4) before market segments are extracted (Step 5). The resulting market segments are profiled (Step 6), and described (Step 7) in detail. Step 8 is the point of no return where the organisation carefully selects one or a small number of market segments to target. Based on this choice, a customised marketing mix is developed (Step 9). Upon completion of the market segmentation analysis, the success of implementing a market segmentation strategy needs to be evaluated, and segments need to be continuously monitored (Step 10) for possible changes in size or in characteristics. Such changes may require modifications to the market segmentation strategy.



Fig. 2.2 Ten steps of market segmentation analysis

Although the ten steps of market segmentation analysis are the same for commonsense and data-driven segmentation, different tasks need to be completed for each one of those approaches. Typically, data-driven segmentation requires additional decisions to be made. The following chapters discuss each of these steps in detail, and provide tools that can be used to implement each step in practice.

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