

1-1-2009

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### **Recommended Citation**

Dolnicar, Sara and Lazarevski, Katie: Methodological reasons for the theory/practice divide in market segmentation 2009, 357-373.  
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## Methodological reasons for the theory/practice divide in market segmentation

### Abstract

A theory/practice divide exists in market segmentation. The main reasons are the focus of academic studies on statistical techniques, and managers' lack of understanding of fundamental segmentation basics (Dibb 2005; Greenberg and McDonald 1989). To date, only one study has explored methodological reasons for the theory/practice divide: Dibb and Simkin 1994. We extend their work by: (1) detailing key methodological aspects likely to cause difficulties in translating segmentation findings into managerially useful information, and (2) empirically investigating specific research questions about methodology-induced reasons for the theory/practice divide derived from both theory and the propositions of previous studies. Results indicate a large proportion of managers lack a fundamental understanding of market segmentation methodology, thus over-interpreting the validity of solutions. More than 60 per cent of managers indicated that to them, market segmentation is like a "black box", and they have difficulties interpreting presented segmentation solutions. Practical recommendations for improvement are provided.

### Keywords

methodological, practice, reasons, theory, segmentation, market, divide

### Disciplines

Business | Social and Behavioral Sciences

### Publication Details

Dolnicar, S. & Lazarevski, K. (2009). Methodological reasons for the theory/practice divide in market segmentation. *Journal of Marketing Management*, 25 (3-4), 357-373.

# **Methodological Reasons for the Theory/Practice Divide in Market Segmentation**

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## **ACKNOWLEDGEMENTS**

We thank the Australian Research Council for supporting this research through the ARC Discovery Grant DP0557769 and the ARC Linkage International Grant LX0559628.

## **Methodological Reasons for the Theory/Practice Divide in Market Segmentation**

### **ABSTRACT**

A theory/practice divide exists in market segmentation. The main reasons are the focus of academic studies on statistical techniques, and managers' lack of understanding of fundamental segmentation basics (Dibb 2005; Greenberg and McDonald 1989). To date, only one study has explored methodological reasons for the theory/practice divide: Dibb and Simkin 1994. We extend their work by: (1) detailing key methodological aspects likely to cause difficulties in translating segmentation findings into managerially useful information, and (2) empirically investigating specific research questions about methodology-induced reasons for the theory/practice divide derived from both theory and the propositions of previous studies.

Results indicate a large proportion of managers lack a fundamental understanding of market segmentation methodology, thus over-interpreting the validity of solutions. More than 60 per cent of managers indicated that to them, market segmentation is like a "black box", and they have difficulties interpreting presented segmentation solutions. Practical recommendations for improvement are provided.

**KEYWORDS:** Market segmentation, methodology, theory/practice divide

## **AUTHOR BIOS**

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## INTRODUCTION

Market segmentation has a long history. The concept was introduced in 1956 by Smith, who defined it as “viewing a heterogeneous market (one characterised by divergent demand) as several smaller homogeneous markets” (p. 6). Since Smith, segmentation methods have become more sophisticated, yet researchers’ focus on segmentation techniques (Wind 1978) and academically valid segmentation solutions provide little practical guidance to industry (Dibb and Simkin 1997).

Many factors can prevent industry from maximising benefits from market segmentation solutions. Most problems occur at the managerial or organisational level, and are strategic or conceptual in nature, for example, within organisations that have the following characteristics (Dibb and Simkin 2001, Dibb 2005): inflexible organisational structures, no culture of data collection, lack of communication, lack of expertise (specifically marketing expertise), unclear role distribution regarding the implementation of segmentation solutions, mismatch segmentation solutions and tactical programs, and lack of clarity about goals and applicability of segmentation findings (Dibb and Stern 1998). Managers frequently lack conceptual understanding of market segmentation (Dibb and Simkin 1994) and commitment (White 1992), and consequently do not provide adequate budgets for segmentation or its implementation (Dibb and Simkin 2001).

Greenberg and McDonald (1989) discriminate between two forms of failures in the practical implementation of market segmentation: *engineering failures* and *mechanical flaws*. *Engineering failures* result from faulty conceptualisation and

implementation of market segmentation. *Mechanical flaws* occur if the technical execution of the segmentation study is flawed.

Our study investigates *mechanical flaws*, and contributes to the understanding of why the theory/practice divide occurs in the area of market segmentation. We examine which methodological aspects of segmentation studies contribute to the communication problem between researchers/data analysts on the one hand, and managers on the other. Misunderstandings about methodological aspects of segmentation studies contribute to the theory/practice divide, because lack of understanding of how segments are derived typically leads to overestimating the validity of the segmentation solution. In turn, overestimating this validity can lead to substantial marketing expenditures being used on suboptimal segments, for instance, on highly dynamic segments that have changed needs by the time marketing mix action is taken. This study is the first empirical survey of managers that offers insight into the extent of the problem, as opposed to merely identifying key issues.

The present study contributes to the body of knowledge in two ways: (1) it is the first to focus on the investigation of detailed aspects of segmentation methodology and misunderstandings arising thereof, and (2) is the first quantitative study that questions a large number of managers from a range of industries about their understanding of segmentation and the difficulties they face. Conducting a quantitative study in this context is important because – while previous studies using qualitative techniques were very successful in revealing the main causes for the Theory/Practice Divide – qualitative methodology does not allow any statements about the proportion of managers who are facing certain kinds of difficulties when trying to apply market

segmentation in practise. The use of quantitative methodology enables us to draw conclusions about the extent of the problems in terms of the proportion of managers who encounter specific problems in trying to apply market segmentation.

The paper is structured as follows: first, a theoretical analysis is presented discussing a series of methodological aspects which can lead to the misinterpretation of results by managers. From this, explicit research questions are derived. Then, these research questions are empirically investigated through a survey among marketing managers.

Note that the study is limited to *post-hoc* (Myers & Tauber 1977), *a posteriori* (Mazanec 2000) or data-driven (Dolnicar 2004) segmentation studies. *A priori* segmentation studies, where consumers are split according to a single characteristic (for instance, age), do not cause the same implementation difficulties. We define data-driven segmentation as dividing consumers into disjunct groups, using methods other than a single splitting criterion or cross-tabulations to construct segments.

## **METHODOLOGICAL REASONS FOR THE THEORY/PRACTICE DIVIDE**

Several possible misconceptions can lead to misinterpretations of segmentation solutions, especially the overestimation of validity.

First, the **quality of the data** is central to a managerially useful segmentation solution. This may not be clear to managers. Data are of high quality if (1) the questions asked have a strong theoretical foundation, (2) data are not contaminated by respondent fatigue (Johnson, Lehmann & Horne 1990), (3) data are not contaminated



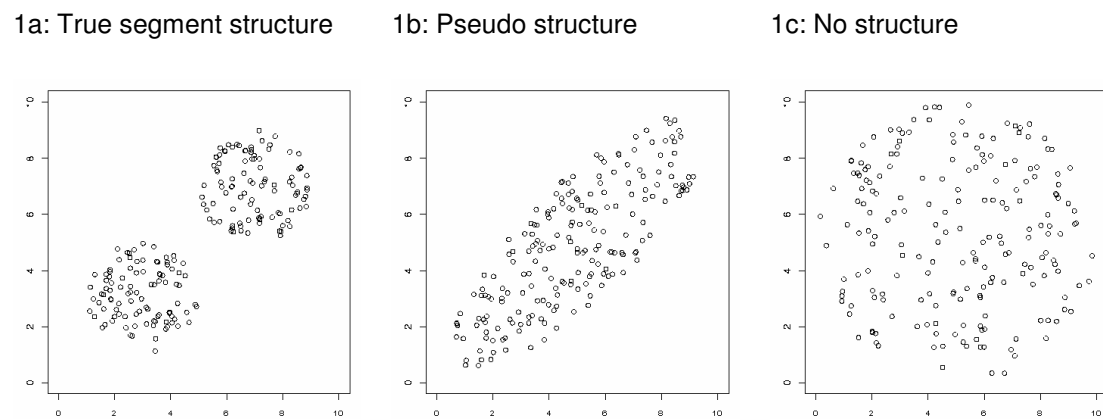
by response styles (Cronbach 1950; Paulhus 1991; Greenleaf 1992a, 1992b; Baumgartner & Steenkamp 2001), (4) data are recent, and thus reflect the current market situation, (5) data were collected specifically for the purpose of segmentation, and (6) variables are not uncritically included, but carefully developed in pre-studies (Aldenderfer and Blashfield 1984; Everitt 1979). Milligan (1996, p. 348) explicitly warns that “Far too many analyses have been conducted by including every variable available... Most researchers do not appreciate the fact that a variable should be included only if a strong justification exists that that variable helps to define the underlying clustering.”

Most data quality problems cannot be resolved after data collection. Therefore, only a few recommendations about how to address problems of data quality can be made. Greenleaf (1992a, 1992b) proposed a method of measuring extreme response styles, several other researchers have made alternative recommendations (Cunningham, Cunningham & Green 1977; Heide & Gronhaug 1992; Watson 1992; Chang 1994; Rossi et al. 2001; van de Vijver & Poortinga 2002; Welkenhuysen-Gybels et al. 2003). Standardisation is the most frequently used correction technique. Fischer (2004) reviews standardisation methods commonly used to adjust for response styles in cross-cultural research and provides a classification of the different methods. However, retrospective correction is never as efficient as avoiding to collect contaminated data in the first place, because any correction chosen may not correct for all response styles, and could risk introducing new data contamination of the data. Dichotomous answer formats can be used to avoid data contamination and, consequently, the need for ex post data correction.

A few approaches have also been proposed to address the problem of having too many variables in the segmentation base, given the sample size. One approach is referred to as “factor-cluster segmentation” and involves factor analysis of the large set of variables, followed by clustering the resulting factor scores. The disadvantage of this approach is that typically only about half the variance in the raw data is explained by a factor analytic solution. Consequently, a large proportion of the information contained in the data is essentially discarded. Recently, Dolnicar and Grun (2008) showed that factor cluster analysis is inferior to direct clustering of variables — even if the data are artificially constructed following a factor analytic mode. A simple heuristic proposed by Gitelson and Kerstetter (1990) is to include only variables that are agreed with by at least 10 per cent of respondents. Optimally, only a small number of conceptually well-developed items are included in the questionnaire in the first place. All ex post selection methods are heuristic procedures, not solutions. Formann (1984) has proposed a guideline with respect to the number of variables which can be used, given a certain number of respondents recommending a sample of at least  $2^k$  to segment respondents based on  $k$  variables if binary data; preferably  $5 \cdot 2^k$ .

Marketing managers also may not be aware that clustering procedures, the most commonly used method to develop data-driven market segmentation solutions, are *exploratory* in nature. This means that different computations with the same number of clusters will lead to different segmentation solutions, due to random components of the clustering algorithm — such as, for instance, the random choice of starting points.

In assuming that repeated calculations of segmentation solutions produce the same output, managers may believe that “naturally existing market segments” underlie consumer data sets. Such a case is illustrated in the left-hand panel of Figure 1 for the two-dimensional space. The horizontal axis represents consumers’ preferences with respect to the number of product features and prices, and two distinct clusters may exist in this space: consumers who prefer many features at a higher price and those who prefer to have basic features at a lower price.



(modified from Dolnicar & Leisch 2001)<sup>1</sup>

Figure 1: Prototypical data structure situations in market segmentation

Although the assumption of true segments existing in the data reflects the view of market segmentation pioneers (Frank, Massy & Wind 1972; Myers & Tauber 1977), segmentation researchers today acknowledge that consumer data market segments are more frequently constructed (Mazanec 1997; Wedel & Kamakura 1998) than revealed. The reason is that consumer data are typically not very well structured (see

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<sup>1</sup> Figure 1 assumes only a two-dimensional segmentation problem, meaning that only two consumer-based variables are used as a segmentation base. In reality, data-driven segmentation studies use significantly more variables than two.

right hand panel in Figure 1), and rarely contain clear density clusters (see left hand panel in Figure 1). The middle panel in Figure 1 shows the case in which there are no true density clusters but some data structure exists that enables stable reproduction of multiple segments.

The more structured a data set, the higher the similarity of repeated calculations of segmentation solutions with the same numbers of clusters. Less structure in the data leads to more variation in repeated computations indicating that the algorithm is likely to affect the solution. As Aldenderfer and Blashfield (1984, p. 16) warn: "Although the strategy of clustering may be structure-seeking, its operation is one that is structure-imposing. The key to using cluster analysis is knowing when these groups are 'real' and not merely imposed on the data by the method."

Not many solutions – not even those heuristic in nature – have been proposed to address the problem of randomness of segmentation results. No matter which algorithm is preferred (partitioning techniques, latent class analysis, finite mixture models and so on), data analysts tend to compute only one solution for each number of clusters, thus implicitly denying variability across replications. Repeated computation offers a good way to gain insight into the stability of segmentation solutions, and thus provides guidance to the data analyst about whether segments are true or merely constructed. An example of replication being integrated into the (so called bagged clustering) algorithm itself is provided by Dolnicar and Leisch (2003). When replications are computed “manually”, and not as part of a repetitive algorithm, 50 repeat computations are used (for example, Dolnicar 2002).

Several other parameters of the clustering computation can impact heavily on the final solution: the *number of clusters chosen*, the *distance measure chosen*, the *variables included* and so on. Most of these decisions are made by the data analyst in cases where data are not well structured. It is unclear to what extent managers are aware of the effect of these typically subjectively made decisions.

Selecting the optimal number of clusters problem is an old problem (Thorndike 1953). Many criteria have been proposed and compared in studies with artificial data sets to identify which criterion can be used for this purpose (Milligan & Cooper 1985; Dimitriadou et al. 2002). Unfortunately, no single best criterion has emerged. Instead, most criteria identify the optimal number of clusters correctly if the data are well structured, whereas all fail if the data are highly unstructured, as is typically the case in consumer market segmentation.

## **RESEARCH QUESTIONS**

This study investigates the following research questions, derived both from the propositions put forward by Dibb and Stern (1995) and the theoretical discussion presented above: (1) Are managers aware of the importance of data quality on the managerial value of a segmentation solution? To what extent are they aware of the importance of custom-collected data, the use of current data, the potential dangers of response styles, and the importance of using valid variables or selecting them in the best possible way? (2) Are segmentation solutions frequently conducted by staff who are not sufficiently qualified? (3) Are managers aware that a segmentation algorithm always produces a solution, whether density clusters actually exist or not? The

underlying question is: To what extent are managers aware of the fact that market segmentation is an exploratory process by its very nature, and do they understand that segments are typically constructed, not revealed or identified. If they are aware of the exploratory nature, we would also expect that managers would be aware of the structure-imposing nature of the number of clusters and the segmentation algorithm chosen. (4) Do managers overestimate the validity of segmentation solutions? The validity issue is strongly related to the extent to which managers believe that segmentation solutions are: stable (can be reproduced) across repeated computations with the same algorithm or different algorithms, stable over time, and independent of competitor actions. (5) Are managers aware that most decisions that affect the segmentation solution (variables included, number of clusters, algorithm chosen) are decided by the data analyst with little methodological guidance? (6) Do managers have difficulties interpreting market segmentation results?

## **METHODOLOGY**

Australian marketing managers were surveyed using a permission-based internet panel developed for research purposes only. The company used recruits respondents through various avenues leading to a panel demographically representative of the Australian population<sup>2</sup>.

Invitations were sent to 4,270 managers. The survey was taken offline as soon as 200 people completed the survey (for budgetary reasons). This is standard procedure when

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<sup>2</sup> Note, however, that national representativity is not required in this study. It is very unlikely that Australian managers would demonstrate socio-demographic patterns representative of the nation.

collecting data through internet panels. To ensure that this procedure did not lead to response bias, we compared the socio-demographic profiles of the early (10 per cent earliest) and late (10 per cent latest) respondents. Results indicate statistically significant differences between early and late respondents with respect to age, income, education, occupation, gender or state.

In total, 1,230 panel members attempted to complete the survey. Most were screened out because marketing was not part of their portfolio, or they had no experience with segmentation studies. The final sample included 167 respondents. No response bias was detected with respect to those who attempted to respond and those who did not.

Twenty three per cent of respondents in the final sample described themselves as senior executives, 33 per cent as senior managers, 38 per cent as managers, and six per cent as administrators. Seventy-four per cent of managers stated they had a “fair bit” of involvement in market segmentation in their day-to-day business; the remaining 26 per cent said their role involved a high level of involvement in market segmentation-related work. Just over half of the respondents had at least six years experience with market segmentation, and had been working in marketing for at least seven years. Approximately 33 per cent had run through the exercise of choosing a good market segment to target at least three times in their careers, and 80 per cent of respondents believed that in order to develop marketing action based on the segments that emerge from a segmentation study; one must understand the technical details of a segmentation solution. Those who studied marketing at university made up 28 per cent of the sample; 17 per cent studied it at TAFE (technical and further education institutions for post-high school students in Australia); and 55 per cent were trained in

marketing on the job. Consequently, the sample used was well qualified for the study and had a fairly high level of knowledge about market segmentation practice.

Table 1 shows the distribution of respondents in the sample across industries, as well as the number of organisations operating in each industry (Australian Government 2006). The figures in Table 1 illustrate that the data collection method was successful in attracting respondents from a wide range of industries, which reflects the distribution of organisations in those industries relatively well.

*Table 1: Australian Industry Structure and Size Comparison*

		Percentage of	Number of	Per cent of
	Number of	Total	Industry	Industry
	Units in	Industry	Units in	Representation
Industry sectors	Industry Sector	Sector	Sample	in Sample
Property and Business Services	720,832	23.9	37	23.1
Construction	462,240	15.3	8	5.0
Finance and Insurance	418,385	13.9	15	9.4
Retail Trade	273,479	9.1	24	15.0
Agriculture, Forestry and Fishing	257,261	8.5	2	1.3
Manufacturing	153,735	5.1	15	9.4
Transport and Storage	151,932	5	6	3.8
Health and Community Services	120,006	4	15	9.4
Personal and Other Services	114,476	3.8	4	2.5
Wholesale Trade	103,642	3.4	4	2.5
Cultural and Recreational Services	89,670	3	7	4.4
Accommodation, Cafes and Restaurants	68,022	2.3	7	4.4
Communication Services	36,505	1.2	2	1.3



Education	33,931	1.1	11	6.9
Mining	9,121	0.3	2	1.3
Electricity, Gas and Water Supply	2,621	0.1	1	0.6
<b>Total</b>	<b>3,015,858</b>	<b>100</b>	<b>160</b>	<b>100</b>

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*(Seven cases were unclassified, leading to a total of only 160.)*

Each question is based on one of the research questions and described in the Results section. Mostly binary answer options were provided because the questions were essentially knowledge questions.

Descriptive statistics were sufficient to answer the research questions. Responses were analysed using SPSS Version 12.0.1 (LEAD Technologies Inc. 2003).

## **RESULTS**

### ***Research question 1: Are managers aware of the importance of data quality on the managerial value of a segmentation solution?***

First, respondents were asked whether they thought that it was “necessary to design a specific survey for multi-criterion market segmentation studies” or whether “an existing survey data set can be used”. Forty-five per cent of participants believe that an existing data set can safely be used. This puts almost half of the managers at risk of working with segmentation results which may be outdated, thus providing insight into the market structure of the past, rather than the present.

To check if managers were aware of how critical the age of the data is, they were asked to respond “yes” or “no” to the following question: “Do you think that the age of the data set is critical for the quality of a multi-criterion data segmentation solution?” Fifty-four per cent of managers agreed. While this proportion is slightly higher than the proportion of managers believing that it is safe to use existing data for market segmentation, the results are still concerning. They indicate a large proportion of managers are happy to work with a segmentation solution based on old market data in developing marketing strategies and tactics for the future.

In order to explore managers’ awareness of the danger of response style contamination, they were provided with an explanation of response style bias and asked if they believed that response styles could affect segmentation solutions (“Respondents are usually offered 5 or 7 answer options for a question in a survey, typically on a scale from “strongly agree” to “strongly disagree”. Some respondents tend to use the extreme options more (strongly agree and strongly disagree). Others prefer using the middle options more (mildly agree, mildly disagree) across all questions, independent of the content of the questions. This is referred to as a response style. Do you think response styles affect segmentation solutions?”). The vast majority of respondents (80 per cent) were aware that response styles can affect market segmentation solutions. Participants were also asked how they address this problem (“Are you typically aware of how this problem has been dealt with for your particular segmentation?”). Solutions implemented by managers ranged from taking the mean (which does not actually correct for response styles) to using binary answer formats.

The final dimension of data quality under study was the perceived effect of the variables selected as a segmentation base. Participants were asked whether they believed that the “survey questions used for the segmentation” study affect the kind of segments that result from the analysis. In reply, 80 per cent agreed, 11 per cent disagreed and nine per cent were unsure. The majority of marketing managers was aware of the importance of suitable variables to be used in order to arrive at a managerially useful segmentation solution.

These results suggest that significant improvements could be achieved in terms of the managerial usefulness of segmentation solutions if managers were more aware of the importance of data quality. The most concerning findings in this area are that managers were willing to base marketing strategies on potentially old data sets, and that — despite being aware of response styles — they may often work with data contaminated by response styles — because they are not aware of the problem, they do not apply correction methods, or they apply unsuitable correction methods.

***Research question 2: Are segmentation solutions frequently conducted by staff members who are not sufficiently qualified?***

Two questions were used to investigate Research question 2: (1) “Who conducts multi-criterion segmentation studies in your organisation? (Who actually runs the calculations?)”, and (2) “What qualifies this person to run multi-criterion segmentation calculations?”

In 49 per cent of cases an internal data analyst conducted the analysis; an external consultant in 38 per cent of cases; and, 32 per cent of all managers ran their own computations. In 35 per cent of cases the person conducting the analysis was a trained marketing researcher, a trained statistician and an expert in the field was used in 30 per cent of cases, and 22 per cent were people whose segmentation results had proven valuable in the generation of a past segmentation strategy.

Overall, these results are encouraging. Sixty-five per cent of the people conducting the analysis were either trained marketing researchers or statisticians. While the training of marketing researchers may vary, we can assume that both these groups are qualified to conduct segmentation studies. This area can be improved for 35 per cent of the organisations where the level of technical expertise is unclear. Also, the results regarding qualification indicate that many of the misunderstandings may occur in the translation of findings from the data analyst to the manager who develops marketing strategies and tactics on the basis of the analysis.

***Research question 3: Are managers aware that a segmentation algorithm always produces a solution, whether density clusters actually exist or not?***

Managers were asked whether they thought “computing multi-criterion segmentation solutions” is: (a) “a trial-and-error process where a data analyst explores different options” (indicating managers assume an exploratory nature of the analysis), or (b) “a computation that follows clear, pre-specified rules and leads to reliable results” (an answer option that represented the assumption of an underlying deterministic

process). Thirty-nine per cent of managers believe clustering is a deterministic procedure, and 61 per cent believe it is an exploratory process.

Managers were also asked whether they thought “multi-criterion market segmentation solutions reveal market segments that naturally exist in markets”, or “they artificially construct segments”. A total of 68 per cent of participants believe segments occur naturally. Given that 61 per cent of participants were aware that clustering is an exploratory process, the high number of those who believe clustering identifies natural segments is surprising.

With respect to the structure-imposing nature of the number of clusters selection, managers were asked whether they believed that the number of clusters chosen affects the nature of the final segment. Seventy per cent indicated in the affirmative; 17 per cent did not believe the number of clusters choice affects the final segments; and 13 per cent admitted to not knowing the correct answer.

The results with respect to awareness about the exploratory nature of segmentation studies in the broadest sense are concerning: 39 per cent of the managers wrongly believe segmentation algorithms are deterministic in nature, and 68 per cent believe segments occur naturally. This finding indicates the situation has not improved much since Greenberg and McDonald (1989) stated that users of segmentation studies believed in false segmentation myths. One encouraging finding in this context is the awareness that the number of clusters chosen has an effect on the resulting solution. However, given the large proportion of respondents who believe segmentation is

deterministic and that true segments exist, it is likely they also believe the true number of clusters can be easily identified.

***Research question 4: Do managers overestimate the validity of segmentation solutions?***

This section focuses mainly on reliability, but more specifically, stability. Managers' concept of stability of three different kinds was explored: (1) stability of solutions across repeated calculations with the same number of clusters and the same algorithm used, (2) stability of solutions across repeated calculations with the same number of clusters and different clustering algorithms, and (3) stability over time.

First, managers were asked to “imagine that you would repeat a multi-criterion segmentation 100 times using the exact same method of computation”. They were then asked to state whether they thought “that all 100 computations would result in the same solution (like  $2+2$  always leads to 4)” or whether “different solutions result from different repetitions”. Sixty-two per cent of managers were aware different solutions can result, while 38 per cent wrongly believe this procedure leads to the same result each time.

Second, managers were asked: “Imagine that you would repeat a multi-criterion segmentation 100 times using different methods of computation. Do you think that all 100 computations would result in the same solution (like  $2+2$  always leads to 4) or could different solutions result from different repetitions?” Answer options included “each repeated computation leads to the same solution” and “repeated computations

can lead to different solutions”. Thirty-three per cent of managers believed, even under this less restrictive condition of replication of the measurement, that the same segmentation solution would emerge. These results validate the finding under Research question 3 that a substantial proportion of managers believe in the deterministic nature of segmentation.

To investigate evaluation of stability over time, managers were asked whether they thought “market segments remain stable over time”. Twenty-seven per cent of respondents agreed. While it is encouraging that the majority of marketing managers was aware of the instability of segmentation solution over time, it is concerning that 27 per cent wrongly believed that market segments are static. This myth stands in the way of producing and using accurate and up-to-date solutions for a marketing strategy which mirrors consumers’ changes in attitudes, preferences and beliefs.

Finally, managers were asked, in an open-ended question: “Do you know of any ways how the managerial usefulness of a segmentation solution can be assessed?” Five per cent stated it was up to personal judgement of the manager or research expert to assess the validity of a segmentation solution. Statistics and software were used by two per cent of the participants. Repeated studies or comparisons would provide for an assessment of the solution by another two per cent of participants. An increase in profit or sales was a common indicator, stated by seven per cent of the participants. Half a per cent of participants indicated an assessment of the relevance of the clusters would be one way to check validity; another half a per cent stated monitoring the effectiveness of actions taken informed by the segmentation study or assessing the ease of operationalisation of the solution. These results indicate that validating

segmentation solutions was not common among managers, but also that the tools used to validate solutions are either highly subjective or use performance indicators which are hard to trace back to the segmentation strategy only.

Based on the above evidence and analyses, 17 per cent of managers working with market segmentation solutions overestimated the validity of market segmentation solutions. This is concerning because they consequently overestimated the firmness of the foundation on which they developed marketing strategies. It also indicated they were actually not prepared to constructively question segmentation solutions presented to them by consultants, instead probably taking them as a given, rather than requesting alternative solutions as well as arguments for or against using a certain solution as the basis for a marketing strategy.

***Research question 5: Are managers aware that most decisions that affect the segmentation solution are decided by the data analyst with little methodological guidance?***

Managers were asked about the extent to which they believed that the data analyst influences the final segmentation solutions (“For each of the aspects listed below, who do you think has control/gives guidance over the segmentation solution?”). Variables in this investigation included, for example, the number of clusters, the algorithm chosen, survey questions and sample size. Participants were asked to specify whether the decisions regarding each of these parts are primarily decided by the statistical method itself, the data analyst or the manager. Figure 2 illustrates the responses elicited.



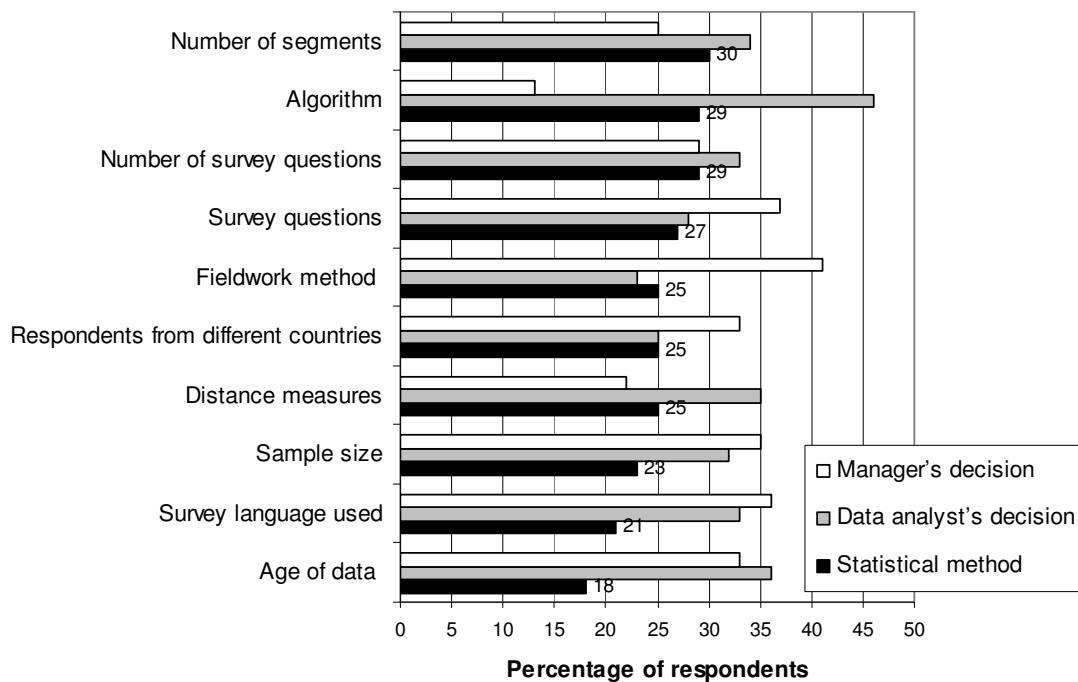


Figure 2: Attribution of segmentation-related decisions

Results indicate that between 18 and 31 per cent of respondents believed that the statistical method provides guidance for various steps in the segmentation process, although in most cases, the data analyst or manager needs to make the decision.

The proportion of marketing managers who regularly worked in the area of market segmentation who overestimated the extent to which the method guides the segmentation process is relatively high. These results reinforce prior points about the risks of relying on data analysis tools without prudent execution or careful interpretation.

***Research question 6: Do managers have difficulties interpreting market segmentation results?***

Managers were asked (1) whether segmentation solutions presented to them were like a “black box” to them (data goes in and the solution comes out, but it is not clear what happens in between), and (2) whether they have “ever had difficulties interpreting a segmentation solution”.

Sixty-eight per cent of participants agreed with the first statement, and 65 per cent of participants agreed with the second statement. While, overall, this question does not offer any guidance about specific areas of difficulties which could subsequently be improved, it provides a good summary evaluation by managers: close to 70 per cent of respondents admitted to having little insight into how the segmentation solution they used to make strategic decisions was derived, and had difficulties understanding it. This high proportion validates the call for more detailed studies of where the difficulties lie, as well as the development of procedures to ensure that the level of understanding among users of market segmentation solutions increases.

## **RECOMMENDATIONS FOR IMPROVEMENT**

The low level of managerial understanding of the market segmentation process revealed puts segmentation studies at high risk of being used in a suboptimal way.

This situation can be improved if institutional and procedural safety measures are put in place to ensure that managers draw the correct conclusions from segmentation results. “Correct” does not imply that there is a *single* correct conclusion, but that

users need to be aware of the nature — and therefore the inherent instability — of segmentation solutions.

Institutional safety measures that could be set in place include hiring staff members with strong training in segmentation techniques, providing segmentation training to managers responsible for strategic marketing decisions, and increasing the number of inter-organisational communications regarding segmentation studies to repeatedly raise awareness of its role for strategic marketing and its exploratory nature.

While procedural safety measures may be less important if an organisation employs staff who are highly trained in segmentation methodology, they are indispensable when less-trained staff work with results from segmentation studies, develop strategies based on segmentation solutions and recommend marketing mix decisions. A very simple procedural safety measure would be to have a checklist of questions relating to the main methodological difficulties in the segmentation process and use it either as a basis of assessing one's own computations or making data analyst consultants respond clearly to all the questions raised.

Based on the results from the present study, we recommend that the following questions be included in such a checklist:

## 1. DATA

- ☐ When was the data set collected? Is this information current enough to warrant that we are not segmenting markets in the past, but markets of the future?

- ❑ How long was the questionnaire? Is there a risk that the respondents were tired and their responses were not valid?
- ❑ How were the questions developed? Were the questions developed in view of constructing segments? Do they contain the key aspects of what is believed to be the best grouping criterion?
- ❑ Is the number of variables suitable for the sample? In the best case,  $5 \cdot 2^k$  respondents are available for  $k$  variables, but  $2^k$  is also acceptable. If the number of variables is too high, how will data be pre-processed?
- ❑ Is there a danger that the data are contaminated by response styles (tendencies of respondents to answer in a certain way, for example, always agree)? This danger is higher if the data contains respondents from multiple cultural groups and if multi-category answer formats (for example, five- or seven-point scales) are used. If the danger is high, how will the data be pre-processed to try to eliminate this bias?

## 2. DATA STRUCTURE

- ❑ Does the data structure indicate market segments are being revealed or constructed? This can best be assessed by running about 50 repeat calculations using the same number of clusters. Replications can be compared in terms of their interpretation, but also in terms of identical assignment of pairs of respondents, as proposed by Dolnicar, Grabler and Mazanec (1999). If segments are constructed, the responsibility of selecting the best solution lies with the managers who need to assess their comparative usefulness.

## 3. METHODOLOGICAL DECISIONS

- ❑ How will the optimal number of clusters be chosen? If no cluster structure exists in the data, this decision can be based on managerial usefulness (size versus distinctness of segments). If, however, data are structured, repeat calculations with the full range of clusters enables the data analyst to choose which number of clusters leads to the most stable and therefore reliable solution.
- ❑ Which distance measure will be chosen? Is the distance measure suitable for the scale level of the data?
- ❑ Which algorithm will be chosen? Each algorithm forms the solution in particular ways. How does the chosen algorithm affect the solution?

## CONCLUSIONS, LIMITATIONS AND FUTURE WORK

Market segmentation is widely used in industry to select target markets. Yet in practice, the nature of the data analytic procedures underlying market segmentation can lead to incorrect use of segmentation solutions.

Previous research identifies a range of reasons for the existing theory/practice divide in market segmentation. The contribution of the present study lies in exploring in detail the *mechanical flaws* preventing efficient use of market segmentation in industry. We raise several methodological issues not discussed in the implementation literature so far, and provide the first empirical study assessing the extent to which managers make purely methodology-based mistakes in using market segmentation solutions. Finally, we derive recommendations that should help improve the validity of segmentation studies used in industry.

Results from a survey study of Australian marketing managers indicate that a large proportion of managers are well aware of the methodological difficulties associated with market segmentation. Many managers do not have good understanding of market segmentation fundamentals which negatively effects the interpretation and use of segmentation solutions. The main risk lies in overestimating the validity of segmentation solutions because of the assumption that true clusters are revealed which are reproducible and reliable.

The following main misconceptions were found to be common among managers: 70 per cent believed that segments occur naturally; 46 per cent believed the age of the data set is not critical; 45 per cent believed it is not necessary to conduct a special survey for a data-driven segmentation study; 40 per cent believed the process of data-driven market segmentation follows clear, pre-specified rules and leads to reliable results. Problems with validity are also evident: 38 per cent believed each repeated computation with the same algorithm would generate the same solution; 32 per cent believed each repeated computation with a different algorithm would generate the same solution; and 27 per cent believed segments remain stable over time. Overall, 68 per cent perceived the segmentation process as a “black box” and 65 per cent stated they had difficulties interpreting a segmentation solution in the past.

These findings highlight the importance of researchers and data analysts who are preparing data-driven market segmentation solutions to convey clearly what the results actually mean, provide practical explanations and guide them in the translation of segmentation results into marketing strategy — rather than merely presenting

findings resulting from a “black box” process. Managers should take responsibility to educate themselves and their staff about the basics of the process underlying any given segmentation solution. Increased understanding may come in the form of requests for additional computation to be undertaken, which may lead to different, more managerially useful solutions; or in the ability to interpret a given segmentation solution correctly and not overestimate its validity. One simple way of achieving this is by developing checklists that help increase problem awareness among managers, and help them to ask the right questions in the process of developing a market segmentation solution. Such a checklist puts managers back in control, guides them in the right direction, and hopefully stimulates their curiosity and leads to learning and increased understanding of the methodological aspects of the market segmentation process.

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