

The Use of Mixed Methods in Management Research

**Muhammad Moinuddin Qazi Abro¹, Muhammad Adnan Khurshid² and
Alamzeb Aamir³**

Abstract

The using of mixed methodology in banking and finance research has long been in debate. Social science researchers focus on the philosophy and epistemology to validate their findings. In the absence of the laboratories and practical tests, the social science researchers use the mixed methodologies to legitimate their work and validate the findings. It is worth mentioning that, the selection of an appropriate methodology is vital to ensure the validity and reliability of findings in any research, especially finance and banking. Therefore, the purpose of this paper is to explain that how the researchers can mix two different types of methodologies (Qualitative and Quantitative) in the banking and finance research to validate their findings. The paper has been designed in a way to explain the advantages and disadvantages of both the research methodologies and then demonstrated how mixed methodology can be used in one single study, by using the case study of nanotechnology firms in getting finance from banks as a subject. Both quantitative and qualitative research methods have disadvantages or weaknesses, but the triangulation or the use of mixed methodology together with multiple data sources can make research findings more valid and reliable. The findings from mixed method are combined in the study in order to deeply understand the nature of research. Furthermore, the weaknesses of one method can be reduced by the strength of the other method.

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¹Dr., Assistant Professor, Department of Management, College of Business Administration, King Saud University – Riyadh Kingdom of Saudi Arabia.

²Lecturer, College of Business Administration, King Saud University – Riyadh, Kingdom of Saudi Arabia.

³Researcher Department of Management College of Business Administration King Saud University – Riyadh Kingdom of Saudi Arabia.

1 Introduction

The arguments of mixed methods in business management research have continued over recent decades. These arguments focus on the consistence and relevance when applying different methods with different philosophical paradigms in a single research study. In fact, one study can follow different research styles. As pragmatists postulated the compatibility of the research, the mixed methods are used to achieve the complementary results by using the strengths of one method to enhance the other one in a single study. The term “mixed methodology” is broadly defined by Denzin as “the combination of multiple methodologies in the study of the same phenomenon” (Denzin, 2009). The original definition, however, has been expanded with time by mixing in data source method and theory. Kopinak defined mixed method as “gathering information pertaining to the same phenomenon through more than one method, primarily in order to determine if there is a convergence and hence, increase the validity of research findings” (Kopinak 1999). In social science, mixed method can be used to refer to the combination of both quantitative and qualitative data sources in a single study. Creswell suggested a combination method study “is one in which the researcher uses multiple methods of data collection and analysis”. These methods may be drawn from within methods approaches, such as different types of quantitative or qualitative data collection strategies, for example a survey and an experiment. Alternatively, it may be between methods basing on quantitative and qualitative data collection procedures, for instance a structured interview and a survey questionnaire (Creswell, 2013).

Generally, there are some points of view that explain why both quantitative and qualitative methods should be combined in a single study. Prevalently, in current literature there are two main reasons for the combination of qualitative and quantitative methods in a single study that are gaining a more complete understanding of the phenomenon and achieving complementary results by using the strengths of one method to enhance other one. Furthermore, the significance of combination is that by combining methods in the same study, the researchers can partially overcome the deficiencies or biases that arise from one method. In other words, each method has its own weakness or disadvantage, for instance, a quantitative research method may be unable to capture the inner meaning of the research problem, whilst a qualitative method may miss the importance of the objective issues that have influences on the final results of the study. Greene and Caracelli considered five major purposes of combining methods in a single study that are; to seek the convergence of results; to complement the different facets of a phenomenon; to identify contradictions and perspectives; to add scope and breadth to a study; and to enrich information for the data collection procedures (Greene and Caracelli, 1989). Kopinak argued that the different purposes of triangulation research designs are to test several frames of reference or perspectives in analyzing the same data; to employ a variety of data collection strategies in order to test a theory in more than one way; and to combine multiple observations, coders, interviewers and analysts to reduce potential bias. By using mixed-method designs, the weakness in a single method can be replaced or complemented by the strengths of other methods (Kopinak, 1999).

Creswell suggested three models of combination of research designs in social science (Creswell, 2013). In detail, the first model relates to the two-phase design approach in which the researcher proposes to carry out a separate qualitative phase of the study together with a separate quantitative phase of study. The second model concerns the dominant-less dominant design. In this design, the researcher presents a study within a

single dominant paradigm with one small component of overall study coming from the alternative paradigm. In other words, the researcher use two methodologies in one single study, but one is dominant and the other is less dominant. The final model design is the mixed-method design. This design requires a high degree of mixing paradigms. The researcher can mix different perspectives from the qualitative and quantitative paradigms at all methodological steps in the research. These paradigms can be mixed in the introduction, literature review and research question.

For the purpose of this paper, a dominant-less-dominant research design in which a dominant quantitative study in terms of survey questionnaire filled by the senior level managers of nanotechnology firms are combined with a small less-dominant qualitative semi-structured interview with the senior level managers of nanotechnology firms. The questionnaire consists of the questions about how effectively the nanotechnology organisations are commercialising their products or services based on nano material, having said that nanotechnology is still relatively a novel technology (Abro, Q.M., et al, 2010a). The combination of data collection can result in the different findings that can complement each other, and provide a fuller, broader and deeper understanding of the different strategic factors which have influence on the operations management success. The necessity of mixed methodology in terms of data collection is that the operations should be viewed by the perceptions coming from the senior level managers, policy makers of different nano science and technology organisations and owners of university spinout organisations to reduce the inaccuracy, bias and to develop an overall model for the successful commercialisation of disruptive technology (nanotechnology). Morse illustrated the use of the shorthand labels for both qualitative and quantitative research questions, and a sequence for deciding suitable designs in mixed-method study. Morse also suggested that mixed method can be described between qualitative and quantitative approaches in two forms, known as simultaneous and sequential research design. In simultaneous research design, the research questions can be answered at the same time in the study. The finding results from qualitative data can be reported separately and may not be necessary to relate or confirm the finding results from quantitative data or vice versus. In contrast, in sequential research design, two clear phases can be conducted. The result of the first phase can become essential for planning the next phase. The first questions of the first phase are answered before the questions of the second phase are raised. For the purpose of this paper, a sequential research design is applied in which both quantitative and qualitative data collection processes are carried out at the different points of time. The findings from the qualitative data help the researchers to prepare the survey questionnaire effectively for the next phase of research. In fact, the results of the first phase of data collection (qualitative) are used to design and consolidate the survey questionnaire in the second phase (quantitative).

2 Measurement of Commercialisation of Nanotechnology: Qualitative Approach

The qualitative method is used when the researchers wish to be closer to organisational members in order to gain the sort of insights into people and situations they require for their research (Silverman, 2002). Generally, interpretivism researchers use qualitative method to understand the way people construct their reality (Smith et al., 1991). On the

other hand, positivism researchers also use qualitative method in data collection phase in order to gain greater understanding of their studies (Denzin, 1970). The label 'qualitative interview' has been used to describe a broad range of different types of interview, from those that are totally non directive or open to those that are prepared as a list of questions that interviewers intend to ask in the interview. In fact; depending on the purpose of the research and related information required by analysis in the research, interviews can be in forms of structured interview (standardised), unstructured interview (non-standardised), and partially-structured interview (Sale, et al, 2002). The structured interview is design to collect the same data from each respondent in the research sample. In structured interview or partially structured interview, the interviewer prepare the list of question or interview guide depending on the purpose of data collection in order to direct the interview on a path consistent with the purpose of the research.

The interview guides can provide the topic or subject area that the interviewer can feel free to explore, probe and ask question (Patton, 1980). Furthermore, the interview guides can be developed more or less relying not only on the researcher's ability to address and specify the important issues, but also on the limited time available and particular situation as the interview is carried out. Through probes, follow-up questions and attention to non-verbal cues, the researcher can validate the data collected (Newman, 1998). The researchers further argued that interview technique shows quite good validity in term of research strategy. It provides more complete and more accurate information than other techniques. However, this method also shows the limitation because the subjective bias of the interviewer can have an influence on the interpretation of the data collection, but this limitation may be more likely with the unstructured interview than with structured interview (Newman, 1998). In this study, a structured interview is carried out to collect qualitative data from the managers of the nanotechnology firms in order to serve the purpose of constructing and validating the questionnaire in the next phase of quantitative data collection. The interview guide prepared in which the major issues or questions of the research are able to be addressed and asked in the interview within time and setting limitations.

3 Quantitative Approach: Survey Questionnaire for the Nanotechnology firms

The preliminary questionnaire of the survey reflecting the commercialisation process of nanotechnology firms in terms of success or failure was developed from commercialisation of technology, disruptive technology theories and results from the structured interviews conducted earlier during the qualitative study. It is still believed that nanotechnology is relatively a new area and patterns of commercialisation yet have to be developed (Abro, Q. M., et al, 2010b). Prior to the main survey, a pilot survey of fifteen organisations was undertaken. The purpose was to validate questionnaire design and ensure common response patterns. These comments and ideas from the pilot survey on the content, format and meaning of questions in the questionnaire helped modify the questionnaire in order to ensure that the questions were clear and logical and respondents could follow and answer them easily. The refining tasks of the survey questionnaire have been completed before the questionnaires were officially distributed to the nanotechnology firms in the United Kingdom.

4 Population and Sample

The target population of research was nanotechnology firms, who have successfully commercialised their products or services in the area successfully. The survey questionnaire is designed and sent to the owners and managers who involve in the commercialisation of nanotechnology products and services. There were more than 300 firms listed in the nanotechnology area (Abro, Q. M., et al, 2009).

5 Hypotheses Development and Regression Model

The factors which are responsible for the commercialisation of nanotechnology products or services are measured by asking the direct questions. A regression model analysis is used to express the causal relationship between the commercialisation, regarding as dependent variable and factors that accelerate the possibility of commercialisation, regarding as independent variables. It means that dependent variable is designed in form of dummy variables with 1 for success of commercialisation and 0 for failure of commercialisation. Basing on current theories of commercialisation, two groups of hypotheses were developed, including internal and external influential factors on the possibility of commercialisation. The first is composed of internal factors regarding to firms and the second concerns external factors, such as government support, supply chain.

6 Conclusions

This study applied a mixed methodology in terms of sequential triangulation strategy in measuring the commercialisation of nanotechnology firms in UK. In the study, together with the commercialisation theories, the qualitative data collected from the structured interviews of firm's managers in the first stage is used to construct questions in the survey questionnaire of the second stage. In the sequential design, the results from the survey of nanotechnology firms can provide a significant insight of commercialisation process including hindrances faced by the firms. The findings of study contribute not only the current theories, but also policy implication as well. Furthermore, the results of the study also help researcher produce a deeper and more reliable results in evaluating the nature of the commercialisation process for any disruptive technology.

By using mixed methods with multiple data sources to measure the problem of commercialisation, the findings of study can be more valid and reliable in case of better understanding of the commercialisation process, its problems and hindrances in a developed country like UK.

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