The use of Triangulation in Social Sciences Research: Can qualitative and quantitative methods be combined?

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Abstract

This article refers to a study in Tanzania on fringe benefits or welfare via the work contract[1] where we will work both quantitatively and qualitatively. My focus is on the vital issue of combining methods or methodologies. There has been mixed views on the uses of triangulation in researches. Some authors argue that triangulation is just for increasing the wider and deep understanding of the study phenomenon, while others have argued that triangulation is actually used to increase the study accuracy, in this case triangulation is one of the validity measures. Triangulation is defined as the use of multiple methods mainly qualitative and quantitative methods in studying the same phenomenon for the purpose of increasing study credibility. This implies that triangulation is the combination of two or more methodological approaches, theoretical perspectives, data sources, investigators and analysis methods to study the same phenomenon.

However, using both qualitative and quantitative paradigms in the same study has resulted into debate from some researchers arguing that the two paradigms differ epistemologically and ontologically. Nevertheless, both paradigms are designed towards understanding about a particular subject area of interest and both of them have strengths and weaknesses. Thus, when combined there is a great possibility of neutralizing the flaws of one method and strengthening the benefits of the other for the better research results. Thus, to reap the benefits of two paradigms and minimizing the drawbacks of each, the combination of the two approaches have been advocated in this article. The quality of our studies on welfare to combat poverty is crucial, and especially when we want our conclusions to matter in practice.

Introduction

The classic welfare regimes or models often referred to in Western research do not cover regions like Tanzania in East Africa. Though welfare and models across the globe may share certain characteristics, there will also be more or less profound differences. In this particular research project our focus is on welfare offered by the employers to employees in companies. The poverty in the Sub-Saharan region makes it urgent to map and to explore the full range of welfare providers. In this article, I am concerned with the quality of such studies based on combining methods to ensure their practical potential in improving the living conditions in the region. Exploring health insurances offered via the work contract, works well to illustrate this issue. Insurances can be mapped quantitatively as to frequency including some minor variations like who is covered (employee only or also family?), what risks are included (is treatment of cancer or HIV included or just minor risks?) and certain aspects of practice (do you get the benefit when you need it?). However, to get at the complexity qualitative data may take us further as to the fundamentals of daily life management of such services including the interaction between the actors involved like both employer, employee, insurance company and health clinic or hospital.

In recent years, the use of qualitative and quantitative methods in studying the same phenomenon has received significant attention among scholars and researchers. To prove the importance it has received, some researchers claim it to be a third research method in addition to qualitative and quantitative research methods. Different names have been assigned to this new and growing research position; some of them are multi-strategy (Bryman, 2004), multi-methods (Brannen, 1992), mixed methodology (Tashakkori & Teddlie, 1998), or mixed methods (Creswell, 2003; Tashakkori & Teddlie, 2003). In this article however, I present the classical type of combining qualitative and quantitative methods in studying the same research phenomenon, this is triangulation. The rationale for going back into this classical type of methods combination is due to the own definition of triangulation; and different stages where triangulation can occur in the research process and the reasons why it is used. Triangulation

is more precise as it aims to reveals complementarity, convergence and dissonance among the findings (Erzerberger & Prein, 1997). Another reason is the nature of the research at hand as discussed with different examples in the text below.

There have been mixed views on the uses of triangulation in researches. Some authors argue that triangulation is just for increasing the wider and deep understanding of the study phenomenon (cf. Olsen, 2004). While others have argued that triangulation is actually used to increase the study accuracy in this case triangulation is one of the validity measures (cf. (Webb, Campbell, Schwartz, & Sechrest, 1966); (Smith & Kleine, 1986); (Denzin, 1978); (Golafshani, 2003). Creswell & Miller delineate triangulation as "a validity procedure where researchers look for convergence among multiple and different sources of information to form themes or categories in a study" (Creswell & Miller, 2000). In a broad way triangulation is defined as the use of multiple methods mainly qualitative and quantitative methods in studying the same phenomenon (Jick, 1979) for the purpose of increasing study credibility. This implies that triangulation is the combination of two or more methodological approaches, theoretical perspectives, data sources, investigators and analysis methods to study the same phenomenon. These lead to five types of triangulation; which are methodological triangulation, investigator triangulation, theoretical triangulation, analysis triangulation and data triangulation (Denzin, 1978); Kimchi, Polivka, & Stevenson, 1991). In this case when a researcher employs more than one type of triangulation in a single study, then is said to have employed a multiple triangulation (Polit & Hungler, 1995).

This is a methodological paper designed as one stage forward into entering the field which is expected to start soon. The author is trying to highlight some of the reasons why the use of both "the within-and between types" of triangulation is opted in this particular research. The next section explains different types of triangulation; followed by a section on why and how to use triangulation in research is presented with some examples. Next the paper presents some challenges of using triangulation especially for PhD scholars and similar research work. Finally, the paper ends with concluding remarks.

Types of Triangulation

Data triangulation also referred as data sources triangulation depicts the use of multiple data sources in the same study for validation purposes. According to (Denzin, 1978), there are three types of data triangulation; namely, time, space and person. These types of data triangulation come as the result of the idea that the robustness of data can vary based on the time data were collected, people involved in the data collection process and the setting from which the data were collected (Begley, 1996).

Theoretical triangulation is defined as the use of multiple theories in the same study for the purpose of supporting or refuting findings since different theories help researchers to see problem at hand using multiple lenses (Denzin, 1970 in (Thurmond, 2001). Both related and/or competing theories can be used in formulating hypothesis for the purpose of providing broader and deeper understanding of research problem in hand (Banik, 1993).

Investigator triangulation can be defined as the use of more than two researchers in any of the research stages in the same study. It involves the use of multiple observers, interviewers, or data analysts in the same study for confirmation purposes (Denzin, 1989; (Thurmond, 2001).

Analysis triangulation also referred by some authors as the data analysis triangulation. It is described as the use of more than two methods of analyzing the same set of data for validation purposes (Kimchi, Polivka, & Stevenson, 1991). In addition to validation purposes, analysis triangulation can be described further as the use of more than two methods of data

analysis in qualitative and quantitative paradigms within the same study for both validation and completeness purposes. In other words, whenever a researcher uses both qualitative and quantitative data in the same study, then more than two methods are needed in the analysis towards attaining data validation within the single paradigm; and further extending the analysis between the two paradigms for completeness purposes. In my study on "pay inequities in local and multinational companies in Tanzania", I am expecting to use data analysis triangulation for both validation and completeness purposes because both qualitative and quantitative data will be collected.

Methodological triangulation is defined as the use of more than two methods in studying the same phenomenon under investigation (Mitchell, 1986). This type of triangulation may occur at the level of research design or data collection (Bums & Grove, 1993). Methodological triangulation is the type of triangulation that has been widely used in social sciences. However this type of triangulation is somehow confusing due to the two levels where it can occur in the research process. This has led some authors to refer to qualitative and quantitative research paradigms combined in the same study thereby indicating a paradigmatic connection. Other authors have referred to methodological triangulation as the use of both qualitative and quantitative data collection methods and analysis in studying the same phenomenon (Greene and Caracelli, 1997 in (Thurmond, 2001).

These two distinctions have resulted into two types of methodological triangulation; that is the between- and within-method type of methodological triangulation. The 'between-method triangulation' or across-method triangulation involves combining and utilizing both qualitative and quantitative methods in studying a single phenomenon. The between-method triangulation has been used for the aim of achieving convergent validity and testing the degree of external validity. On the other hand the 'within-method triangulation' involves crosschecking for the internal consistency (Denzin, 1978). Within-method type of triangulation implies that multiple complementary methods within a given single paradigm are used in data collection and analysis. This can be seen when a researcher uses multiple methods within the qualitative or quantitative paradigm towards increasing internal credibility of the research findings.

However, using both qualitative and quantitative methods in the same study has resulted into debate from some researchers arguing that the two paradigms differ epistemologically and ontologically (Hunt, 1991). Conversely, the most important question is *"are the assumptions underlying qualitative and quantitative methods really mutually exclusive"?*[1] Generally, both paradigms are designed towards understanding about a particular subject area of interest and both of them have strengths and weaknesses. Thus when combined together, there is a great possibility of neutralizing the flaws of one method and strengthening the benefits of the other for the better research results. In the same vein, Hinds acknowledges that combining both qualitative and quantitative methods "increases the ability to rule out rival explanations of observed change and reduces skepticism of change-related findings" (Hinds, 1989), pp. 442).

Taking into considerations that both methods in qualitative and quantitative paradigms have strengths and weaknesses, the paper focuses on the within- and between-method type of triangulation. Thus, to reap the benefits of two paradigms and minimizing the drawbacks of each, the combination of the two approaches have been advocated in this paper. Putting this idea in a far sighted lens, the two paradigms should be seen as complementary rather than substitutable. A paradigm is defined as *"the basic belief system or worldview that guides the investigator, not only in the choices of method but in ontological and epistemological*

1. (Spicer, 2004)

fundamental ways"[2]*.* Paradigms are social constructs and are not theories in themselves; however they are the foundations of theory as they give directions on how theory building can move forward in a meaningful way.

However, the process of combining these two paradigms in the same study is said to be challenging (Foss & Ellefsen, 2002). Even some of the authors (cf. Webb et al., 1966; Smith, 1986; Denzin, 1978) who have suggested the combination of the two fail to justify how methods can actually be merged (Jick, 1979). In the same vein Maxwell and Loomis, 2003 pp. 256 contends that;

"Uncovering the actual integration of qualitative and quantitative approaches in any particular study is a considerably more complex undertaking than simply classifying the study into a particular category on the basis of a few broad dimensions or characteristics" (Maxwell & Loomis, 2003)

Addressing on the challenges of how to combine the two paradigms in the same study, Morse suggests possible two ways in which quantitative and qualitative methods can be triangulated. First, qualitative method used as preliminary inquiries in a quantitative study; whereby, qualitative methods are regarded as supplementary methods. Secondly, quantitative methods precede as preliminary inquiry in a qualitative study in the sense that quantitative methods are regarded as auxiliary methods (Morse, 1991). Principally, wherever qualitative and quantitative methods are used in the same research project, it is assumed in advance that the researcher has clear prior understanding of the main ontological and epistemological position of the phenomenon under investigation (Denzin & Lincoln, 1994; Foss & Ellefsen, 2002).

Epistemology is the foundations of the true knowledge and is important in the creation of new knowledge because it provides a means of understanding on how we generate and acquire scientific knowledge. Epistemology is imperative in knowing the what, how and why of scientific knowledge. This implies that epistemology helps us in knowing the certainty and truth or falsehood of what we claim as new knowledge. Thus, epistemology is the theory of knowledge since it deals on what is knowledge and how we can acquire a valid scientific knowledge (Hischheim, 1985). There are several different ways on how to engender new knowledge; this is what can be referred to as different 'isms' of theory of knowledge. Since this paper does not focus on theories of knowledge, these 'isms' of knowledge development are not discussed here.

Why Triangulation?

The use of triangulation in social sciences is originated from the work of (Campbell & Fiske, 1959) through their idea of 'multiple operationism' towards validating the research results. Field and Morse (1985) in Morse, (1991) assert that, there are multiple uses of triangulation, however a less common one is to ensure the instruments' validation by attaining the same results. In this paper, I make use of the two main reasons of triangulation as identified by (Shih, 1998); that is using triangulation for confirmatory and for completeness purposes.

Triangulation for Confirmation Purposes

There are more benefits of using triangulation for confirmatory purposes. The classical benefit depicted by various methodologists is the validation of qualitative results by quantitative studies. Not only that but also researchers use triangulation for validating quantitative research instruments when the research phenomenon under investigation has little theoretical underpinnings. In quantitative approach, triangulation for confirmatory purpose is normally applied to confirm if instruments were appropriate for measuring a concept (Flick, Kardoff, &

2. (Guba & Lincoln, 1994).

Steinske, 2004). In addition to that, as a confirmatory approach, triangulation can overcome challenges related to a single-method, single-observer and single-theory biasness and thus can be applied to confirm the research results and conclusions (Denzin,1989 in (Shih, 1998).

However, (Foss & Ellefsen, 2002) pose a very relevant challenge regarding the use of triangulation especially when the purpose is confirmation. Wherever, different methods reveal contradictory results, which results should be believed valid? Should the methods be equally weighted? Following suggestions of Morse (1991), I argue that if the primary method of the researcher lies on the qualitative arena for example, then the within-methods type of triangulation should carry more weight and quantitative methods therefore be for complementary purposes. On the other hand, if the within-methods leads into divergent findings between them, and one of the within-methods' findings converge with the quantitative one, then the between method type of triangulation should be given more weight towards confirming the research findings. This implies that if the outcomes of the within-methods are converging, while those of the supplementary method contradict, then the researcher has confidence to believe the consistent results of the main epistemological and ontological positions.

To clearly elaborate on this argument, I will present another theoretical illustration of how qualitative and quantitative methods can be combined for confirmation purposes in studies such of company welfare (and beyond). Suppose a socially responsible chief executive officer (CEO) of a multinational company is interested in improving the social welfare of her employees. However being a foreigner, she has no idea of what exactly employees prefer and value as something that will improve their social welfare. In searching for answers, the CEO has given the contract to the scientific investigator to search for the possible preferences based on the employees' perception. The investigator decides that qualitative methods mainly interviews in Focus Group Discussion (FGD) and in-depth personal interviews with middle managers will be the main method; but also plans to utilize quantitative method through questionnaire and results analyzed by Confirmatory Factor Analysis in order to complement the qualitative methods. The company has 500 employees, from which 100 participated in FGD, and other 50 departmental and sectional managers involved in personal in-depth interviews. After the results from the within-method, the researcher supplied questionnaires to other 200 employees who did not participate before. So in total, the study included 350 employees.

Results from the FGD indicate that there are two employees' preferences towards improving their welfare which are; *free health services* and *support of employees' children education*. However, results from middle managers indicate that there is one extra preference on top of those obtained in FGD and that is *providing welfare money in cash basis to each employee*. Based on these findings from within-method, the question is which results should be considered valid? Do employees have 'two or three' preferences? At the moment, I would say that these results are inconclusive. Suppose the researcher acts as an operationalist, formulates perception measures which define the above factors based on the survey questionnaire given to employees. Note that the purpose of the researcher now is to confirm whether employees' preferences are either TWO or THREE. On a five 5 point Likert scale, employees are required to respond accordingly on the following:

- Provision of health insurance is the most important aspect of improving employees' social welfare Introduction of first aid at work place has a significant contribution in employees' social welfare
- Subsidized medicine for the employees' family members will add value to employees' social welfare
- Additional cash pay based on employees' performance will motivate employees and further improve their company's and employees' social welfare
- Provision of housing allowance has a significant role in improving employees' social welfare

– Payment of full school fees to employees' children will improve employees' social welfare
– Establishing a low cost baby care and school for the employees' children is an important aspect in improving employees' social welfare

Note that the researcher as a constructivist understands the depiction of each of the above sentence on the three factors. To keep the reader on track, I disclose the representation of each sentence on the factors. The first three sentences represent *health services* dimension, the fourth and fifth sentences captures the *welfare money* dimension and the last two sentences captures the employees' preferences on *employees' children education* dimensionality. After data analysis the results appear as in Table 1. In terms of construct validity the researcher is interested in whether measures capture what they intended to measure. Convergent validity has been maintained in the example provided because all measures correlate highly to only those concepts they intended to belong. Conversely, discriminant validity has been maintained because measures correlate lowly to those concept in which they do not belong. Convergent and discriminant validity may be of less interest to the researcher if qualitative methods were the only techniques. Since quantitative methods are intended as complementary methods, then the concepts are still important**.**

Table 1: A hypothetical Illustrations of factor loadings on the 3 Factors

	FHS	ECE	EWM
Provision of health insurance is the most important aspect of improving employees' social welfare	0.8944	0.1356	0.1664
Introduction of first health services at work place has a significant contribution in employees' social welfare	0.7582	0.0196	0.2641
Subsidized medicine for the employees' family members will add value to employees' social welfare	0.6752	0.1234	0.02563
Increased work safety has lead to employees' morale and productivity	0.1412	0.6854	0.0988
Introduction of first aid services at work place has resulted into high employee's morale towards working	0.2342	0.8743	0.1432
Payment of full school fees to employees' children will improve employees' social welfare	0.1646	0.2614	0.7944
Establishing a low cost baby care and school for the employees' children is an important aspect in improving employees' social welfare	0.1405	0.1567	0.8515

FHS → Free health services; ECE → Employees' children education; EWM→ Employees' welfare money

The idea is that if the three factors do really exist as revealed by results of the interviews, then we expect the factor loadings (correlations) of all items to their respective construct to be high. Likewise, if the factors are only two as revealed by the findings from the FGD, then items capturing the third factor will correlate lowly to it. Based on this description, it is apparently confirmed that using quantitative method as a complementary tool, the factors are three. Since the results of the primary method (i.e. qualitative methods in this case) and complementary method (i.e. quantitative method in this case) converge, there is a strong evidence to believe on the consistent results of the two methods. Hence, using both qualitative and quantitative methods lead a researcher to confirm on his/her research results.

There are some issues which need to be considered based on the above explanation. First, the aim of the discussion is to indicate that advantages of qualitative and quantitative methods can be combined to increase the researcher's confidence on the credibility of the results. The approach indicated above is just one of many. Secondly, with triangulation, the problem of small sample is solved and problem of contradictory results of the within methods can be avoided. So if results of the complementary method converge to one of the results in the main methods, external validity (generalizability) and internal validity (consistency) are increased.

Triangulation for Completeness Purposes

For completeness purposes, researchers use triangulation to increase their in-depth and understanding of the phenomenon under investigation by combining multiple methods and theories (Fielding& Fielding, 1986; in (Shih, 1998). The use of triangulation for completeness purposes gradually emerged in the literature (Jick 1983, Fielding & Fielding 1986, Redfern & Norman 1994) and it is important in conducting researches since it allows for recognition of multiple realities (Tobin & Begley, 2004). The use of mixed-methods in studying the same phenomenon continues to be advocated by various scholars (cf. Coyle & Williams 2000, Mactavish & Schleien 2000, Creswell 2002) for the purpose of enlarging and deepening the understanding of the research enquiries.

Triangulation for completeness purposes is used mainly in researching the less explored or unexplored research problems. One of the advantages of qualitative research paradigm is generating the rich amount of data that further can help researchers in developing hypotheses for quantitative investigations. For any scientific work, developing hypotheses requires a problem with rigorous theories; however this is not the actual fact in this world. There are some problems that are less researched and un-explored, hence to come up with credibly testable hypothesis for these problems researchers need to make use of qualitative and quantitative methods. One example of the unexplored research phenomenon is the equivocal provision of fringe benefits to employees by multinational companies operating in Tanzania. As Ryen and Habi (1994) document that *"the value of benefits offered in one organization may be more than twice the value of the same benefit offered in another company".* However, (Ryen & Habi, 1994) did not explain why these differences exist and there are no other studies on these divergences on the pay-packet of multinational companies operating in Tanzania. Taking this into considerations, I intend to triangulate both qualitative and quantitative methods towards exploring the reasons for these divergences.

In addition to unexplored research phenomenon, triangulation for completeness purposes is of significant in studying the complex research phenomenon. Thus, a researcher can start by employing the within-methods in the qualitative paradigm to generate more rich data and getting wider understanding of the phenomenon under study. After rich data is being generated by qualitative research method, then a researcher has to employ the quantitative research methods in the form of data collection methods and analysis towards having deeper and more comprehensive picture of the phenomenon under investigation.

Studying fringe benefits in multinational companies is a complex phenomenon due to the fact that these companies are from different countries characterized with a distinct cultures and institutions. Despite increasing interaction in global world, national business systems remain distinct due to differences in national cultures and due to different paths of industrialization (North, 1990; Hollingsworth and Boyer 1997; Crouch 1993; Lane 2000). The institutional framework of a national business system which is derived from nation's culture is seen to be part of competitive advantage (Porter 1990) in global competition. In this regards, it is imperative for multinational companies to import some of the practices into host countries when they find possibilities of doing so especially if these practices create a company's competitive advantages.

Tanzania being characterized by permissible institutions that govern labor market especially in the provision of fringe benefits experiences equivocal comparisons of these benefits from one multinational company (MNC) to another. This can be explained by the help of an example. Take a multinational company from Norway, a welfare state country and the second multinational company from Kenya a non-welfare state country. Given the freedom they have in deciding on what, how, why and when to give an employee as a fringe benefit and differences in their originalities, it is imperative to assume that the two companies provide dissimilar fringe benefits. For a multinational company from Norway it is important to take care of all of its employees due to the fact that the company is from a welfare country where assuring equitable standard of living for all is crucial. On the other hand, for a company from a non-welfare country (Kenya in our case) differences in employees' social life is a normal thing. Hence seeing only top employees receiving substantial amount as fringe benefits and those at the lower levels receive nothing is the order of the day. These differences signify a complexity in studying fringe benefits in multinational companies operating in Tanzania. As explained above one of the reasons of using triangulation for completeness purposes is complexity of the research phenomenon. Thus, for a researcher studying fringe benefits in the companies portrayed above requires the use of more than one method of data collection towards capturing these differences that emerge as a result of both permissive institutions and country-of-origin effect.

From the above discussions on the rationale for triangulation, one can see that there is a clear point of departure between the use of triangulation for confirmation and completeness purposes. For confirmation purposes a researcher can use only the within-method type of triangulation and if s/he finds the results converging between the within methods employed then the confirmation purpose has been reached. On the other side, both the within- and between-method triangulations are important when the main reason of employing triangulation is for completeness purposes.

Challenges facing researchers towards implementing triangulation

Despite the rich benefits of triangulation as a research strategy, it still has limitations toward some research purposes. Since PhD candidates want to come up with a unique contribution in the theory; they may be eager to implement both types of triangulation towards reaping the strengths and neutralizing the weaknesses of both qualitative and quantitative methods as documented by Jick (1979) that "triangulation has vital strengths and encourages productive research with unique results". Furthermore, a good quality of the PhD thesis report may legitimatize the use of both types of triangulation. However implementing triangulation in a PhD dissertation research project is more challenging since PhD dissertation is a project characterized with all features of a project. A project is defined as a one time activity with specified completion time and budget constraints towards delivering a unique product. Thus any project activity is limited with specific resources both time and cost.

Apart from the practical challenges a researcher is facing towards implementing methodological approach, Polit and Hungler, (1995) point out that, differences in philosophical position may lead into conflicts between supervisor and supervisee especially in the PhD dissertation work. This is due to the fact that if the supervisor prefers quantitative paradigm and the research problem necessitates the student to employ both qualitative and quantitative methods then the supervisee may find him/herself in a great challenge of convincing the supervisor in accepting and accommodating this philosophical standpoints.

Conclusion

Triangulation is possible and a good way to reap the benefits of both qualitative and quantitative methods. The use of triangulation however will depend on the researcher's philosophical

position. If the researcher's philosophical position is qualitative one and s/he decides that qualitative approach be the main methods, the within methods should then lead throughout the project and quantitative methods should be complementary methods and the vice-versa is true. Yet, it is left upon the researcher to come up with a clear reasoning on why triangulation should be used in such a particular study as (Knafl, Breitmayer, Gallo, & Zoeller, 1996) argue, coming with a clear purpose on why should a researcher use triangulation is an important aspect in reaping the benefits and neutralizing the flaws of the methods to be triangulated towards increasing the credibility of the research results. A general consensus from this paper is that triangulation can indeed increase credibility of scientific knowledge by improving both internal consistency and generalizability through combining both quantitative and qualitative methods in the same study.

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