

MIXED METHOD APPROACH TO DETERMINATION CRITICAL SUCCESS FACTORS FOR SUCCESSFUL FINANCIAL ERP SYSTEM IMPLEMENTATION

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ABSTRACT

Critical success factors (CSFs) for Enterprise Resource Planning (ERP) implementation has been widely discussed in literature with authors revealing it to be the most imperative focus of interlocution among scholars for the consummation of success for any project implementation. However, throughout literature, there have been a critique of methods employed to identify, rank and categorize these CSFs with a call for more robust and scientific rigor methods. This paper, through a comprehensive literature review, discusses the adoption of a mixed method approach in determining CSFs for a successful ERP implementation, hence presenting an enhanced framework for researchers aiming to employ the mixed method approach in addressing complex research study. Furthermore, providing insight into the research dilemma paradigm, methods and methodology.

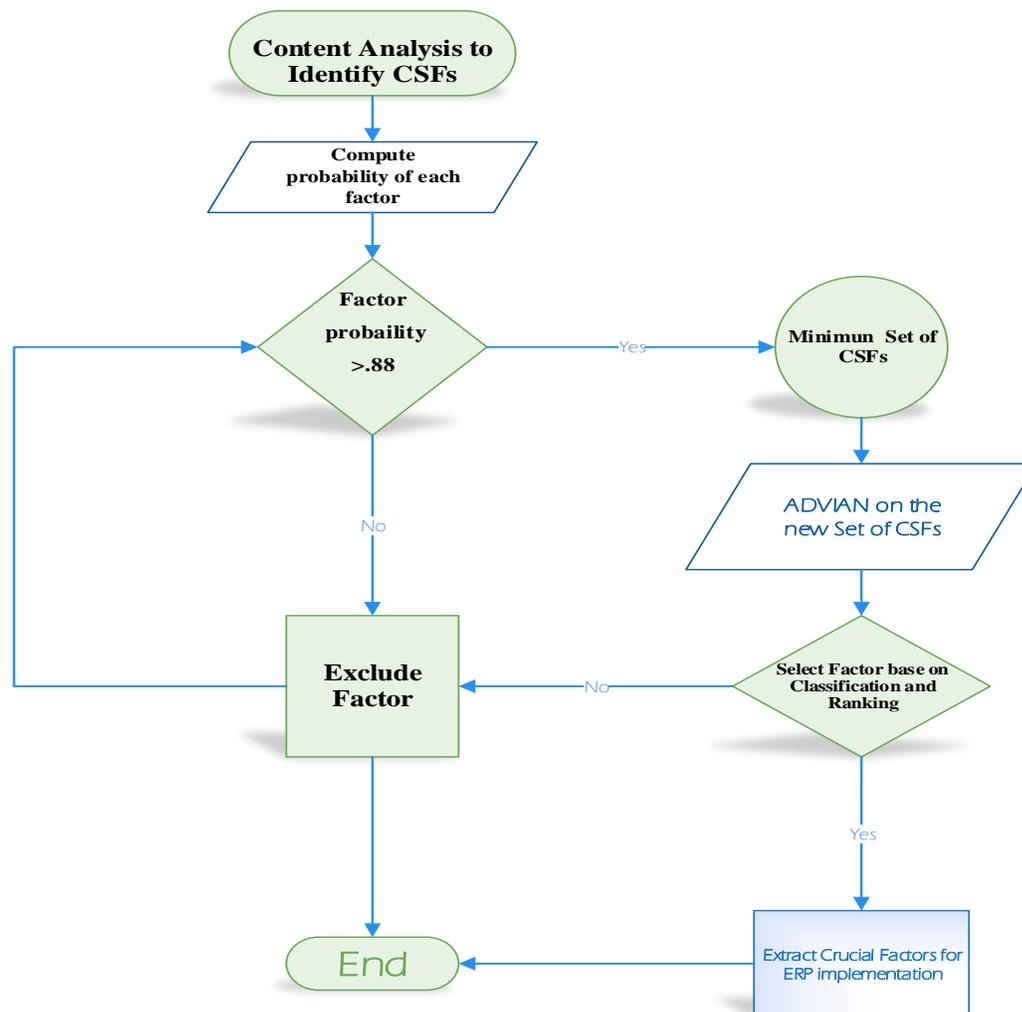
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INTRODUCTION

Undertaking research of whatever pattern or nature, regardless of the subject area of studies entails choices by the researcher that will conduct the inquiry. Nevertheless, this process is ordinarily not the most comfortable to researchers, especially for the inexperience or beginner researchers. While for experienced researcher this is an ongoing debate that a quandary for researchers who are often question regarding their choice of research approach. Mackenzie & Knipe (2006a), posit the research process is a daunting prospect couple with ongoing debates and contradiction that adds to the confusion. Despite available information, the quest for the appropriate research paradigms, methods and methodology of researchers still remains a challenge (Makombe, 2017). Schoonenboom (2019), highlight the research process exacerbation by reporting the struggles researcher understates which involves mangles of rounds of feedbacks just to create and adopt a research model.

This paper aims to demystify the research process phenomena through the discussion of the different aspect of the research process with specific attention paid to the adaptation of mixed methods which is currently on the rise. The research elements are discussed in this regard on using mixed method in “the determination of Critical Success Factors (CSFs) for Enterprise Resource Planning (ERP) systems’ implementation” and to determine a unique set of CSFs require for a successful implementation of ERP system that could support organizational functions such as financial. To realize the objectives a combined approach of quantitative (Phase 1 and 2) and qualitative (phase 1 and phase 3) research method is utilized following three phases. This method aids the researcher to address the following research questions formulated: Main Research questions RQ: What are the critical success factors for ERP implementation to support financial

functions? Sub-RQ1: What is the minimum set of CSFs of ERP system implementation to support financial functions? Sub-RQ2: What is the significance of each factors identified above in the financial ERP system such as salary sub-system? Sub-RQ3: How can these factors be structured into a comprehensive model to support financial functions? Sub-RQ4: What recommendation can be made to management for a successful ERP implementation that would support financial functions? A propose methodological framework to attain the overarching fore mention aims and objective is shown in figures 1.



**FIGURE 1
PROPOSED CSFS DETERMINATION FRAMEWORK**

METHODS

The method that is used in this paper is based on a comprehensive literature review of journal and scholastic articles found in online databases that discussed and feature the keywords. The following keywords were used; Mixed Method, Research Methodology, Design and techniques, Paradigm and methods on the web of science database and google scholar.

DISCUSSION

The research methodology for the topic is presented in this section through a discussion of the theory and practice of research as it relates to the ERP system, CSF concepts and the topic. A pragmatism philosophy is adhered to, and scholarly research evidence couple with the input of an expert panel also are taken into consideration. The selection, inclusion and exclusion rationale of the literature used in this study is presented. To better explain the research process, we considered and discussed the approach and methodology used in the study. Figure 2 from Ngulube (2015). Study summarized the research elements used in the research process.

RESEARCH PHILOSOPHY

The system of belief and assumptions regarding the development of knowledge refers to the research philosophy. Saunders et al. (2009) contend that a sound research philosophy is produced from a constant and well thought out set of assumptions which underpins the analysis procedures, data collection techniques, research questions and methodological choice of the researcher. Authors such as Iofrida et al. (2018a) together with Saunders et al. (2009), opinionated that when a research process is undertaken every methodological choice is based on the scientific paradigm which is at the basic belief or philosophy infer the worldview that guides the researcher.

According to Iofrida et al. (2018b) and Jonker & Pennink (2010), the term paradigm is infamously used to signify the set of fundamental theoretical beliefs, assumptions and methodology techniques shared by the scientific community in normal science. The different paradigm elements have been outlined by the philosophy of science and roles of different research paradigm. Authors, differentiate these elements or dimension of research paradigm; ontology as the researcher conception about the nature of reality, epistemology as the relationship between the knower and what is being studied, axiology as the role of values in research and the researcher's stance and methodology as to how the researcher can find out knowledge (Mackenzie & Knipe, 2006b; Wahyuni, 2012; Iofrida et al., 2018b).

The philosophy best suitable to apply is determined by the research question and purpose and there are four philosophies that can be adopted: Positivism, post-positivism, interpretivism and pragmatism. Positivism philosophy relies on only observable phenomena to provide credible data and facts while focusing on causality and law-like generalisations to reducing phenomena to the simplest elements (Saunders et al., 2009; Wahyuni, 2012).

On the contrary post-positivism although similar to positivism or thought to have replaced positivism from naïve realism to critical realism focuses on explaining within a context or contexts. Separating the existence of an objective, independently from human thoughts, belief or knowledge. (Wahyuni, 2012). Whilst interpretivism based on the belief and meaning that the simple phenomenon is appropriate for every research issue as the real essence of reality cannot be known. Interpretivism-oriented is toward constructivism and interpretivism that is reality is constructed or interpreted through perception (Iofrida et al., 2018b). Finally, pragmatism contend that there no predetermined frameworks or theories that shape truth or knowledge as such it is not committed to any one system or reality or philosophy (Mackenzie & Knipe, 2006b; Saunders et al., 2009).

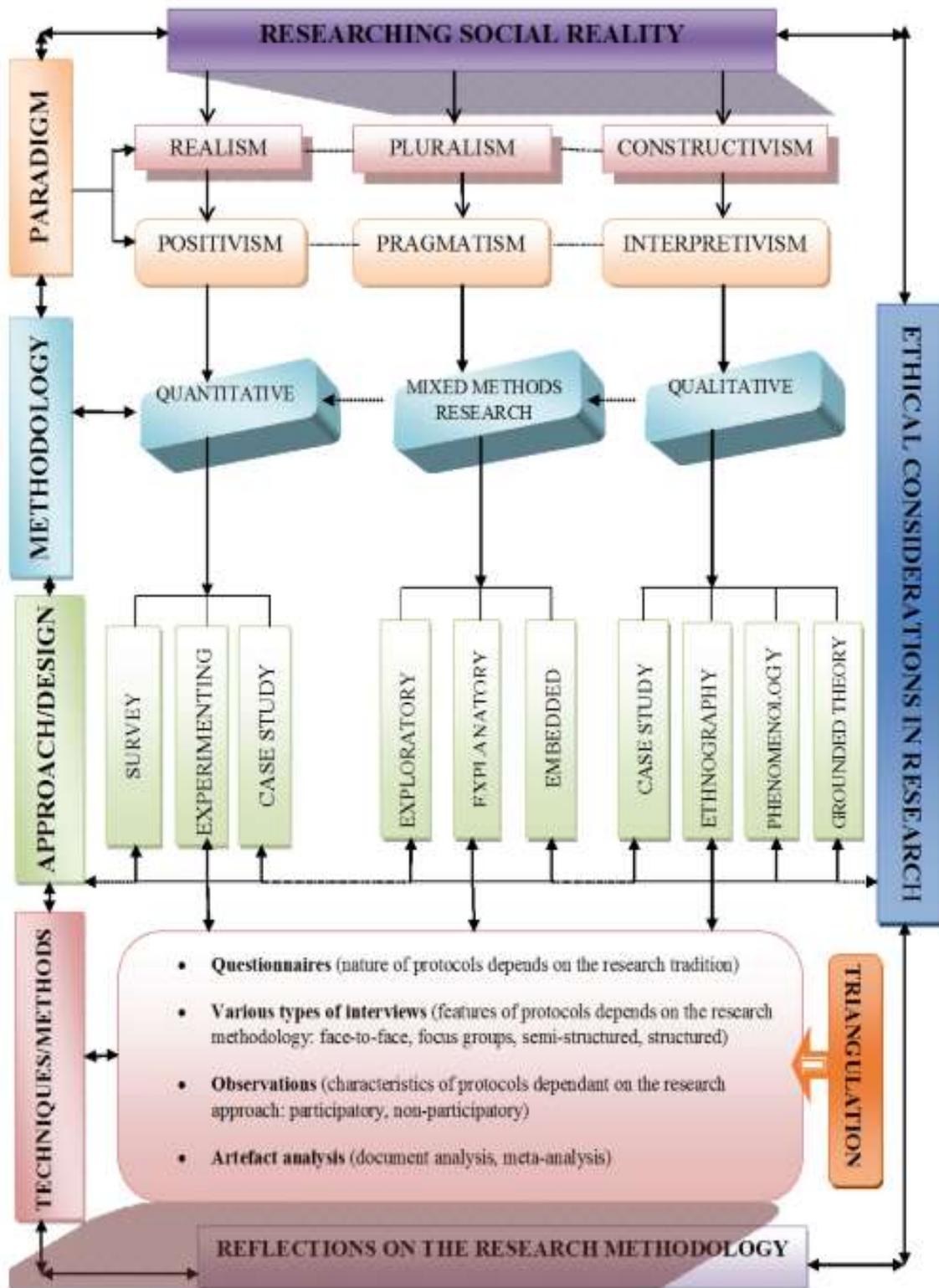


FIGURE 2
A GRAPHICAL SUMMARY OF THE RESEARCH PROCESS ELEMENTS FROM NGULUBE (2015)

Pragmatism is the underlying philosophy behind mixed method as it points out that more than one position can be adopted for a study as research philosophy is a continuum as opposed to an option standing in opposite direction hence does not accept the people constructing their truth out of nothing (Saunders et al., 2009; Wahyuni, 2012). Hence, the philosophy adopted for “the determination of CSFs for ERP systems’ implementation could support organizational functions” is pragmatism as it helps the researcher to perform this study using mixed methods with the purpose of this study to provide acceptable new knowledge dependent upon the research question while focusing on explaining within the context of the financial system.

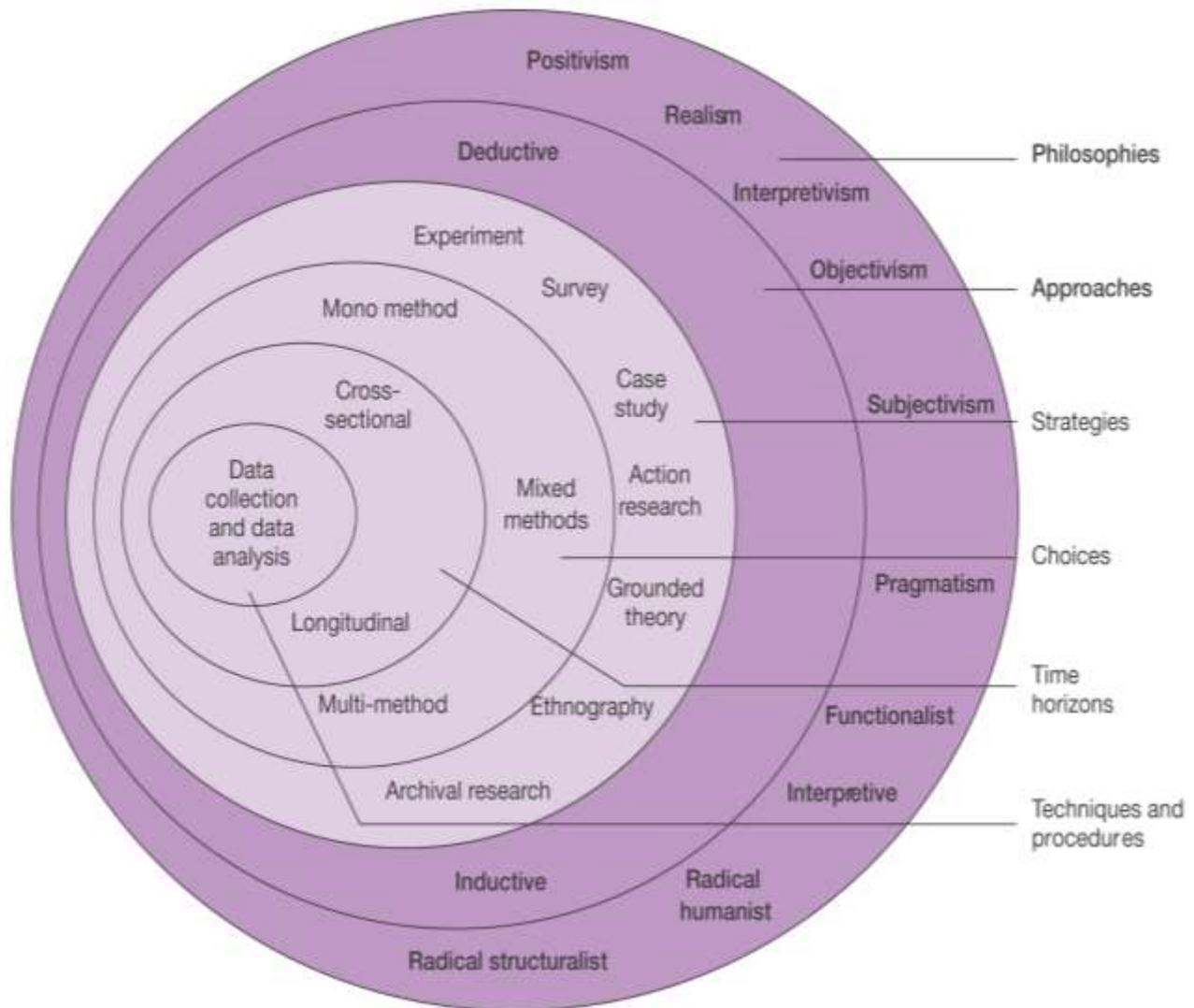


FIGURE 3
THE 6 CIRCLES OF RESEARCH PROCESS; SOURCE SAUNDER (2011)

In addition, since this study aims to research CSFs for ERP system implementation from a financial system perspective a slant different from previous studies an observable phenomena and subjective meaning will be considered providing credible data and fact. The study is conducted in a value-bond and etic-emic where values play a large role in interpreting the results, the researcher

adopting both objective and subjective points of view to yield pure data and fact. Figure 3 shows the different research philosophies in the sixth outer sphere of the six circles of research process adopted from Saunders (2011).

RESEARCH NATURE

The nature of this research affords a track that leads the study in a systematized manner toward the achievement of the research objective. The nature of the study could be either one or combination of the two or more of the various strategies which are exploratory, explanatory and descriptive (Saunders et al., 2009; Kumar, 2019). Since this study uses elements of from the pragmatism philosophy and paradigm it indicates the purpose of this research study may well be descriptive, explanatory and or exploratory.

An explanatory research study strategy seeks to develop an accurate theory which could be adopted to describe practical generalization. While study of a descriptive nature seeks to answer the questions that likely starts with; who, what, where, when and or how of the research study topic and questions. Moreover, with the aim of this study being to identify Critical success factors for ERP system implementation with special attention paid to ERP financial system which involves elucidating and investigating this extent will require an exploratory strategy which aims to build new knowledge.

An exploratory study is adopted when the research study seeks to find out about the topic of interest what is happening, to ask questions and evaluate findings from a different perspective. To determine the CSFs for ERP system with respect to financial system knowledge will be extended to existing knowledge. Hence, to be able to do that an extensive review of literature to adapt it towards the financial system is required, which indicate that the study is descriptive of nature as well. Nonetheless, the research study intended to deliver valuable insight from a financial perspective with the objective CSFs in hand through an ERP system implementation. Henceforth, this research nature combines both descriptive and exploratory strategy leading to the research nature being descripto-exploratory (Saunders et al., 2009; Nabee & Walters, 2018)

RESEARCH APPROACH

Tactics and actions for a research study area are referred to as a research approach (Crowther & Lancaster, 2009). Three approaches cited in literature to research study are deductive approach, inductive approach and abductive approach (Saunders et al., 2009; Åsvoll, 2014). Abductive approach is the first stage of all interpretative processes and any scientific investigation.

Abductive approach implies looking for and exploring potential explanatory patterns within the facts of a phenomenon to reveal a path from facts to ideas and theory, or expressed differently basically it seeks theory. This approach can further new and useful hypotheses (Åsvoll, 2014).

Deductive on the other hand is based on theory or, more specifically, the theory's hypotheses. It is possible to test and categorize the empirical facts with this approach in a more systematic and critical way than abductive consequences. However, deductive approach cannot produce new hypotheses or assumptions since it is fundamentally self-referring, explaining relationship between variables as to test a theory (Saunders et al., 2009; Åsvoll, 2014).

In inductive approach, a new theory is formed is based on research observation and empirical data from qualitative methods (Mertens, 2008; Saunders et al., 2009).

The research approach adopted in this study is the abductive approach as it best suite that research philosophy of pragmatism as it moves to and fro and in essence combining both deductive;

that is required at the beginning of any scientific research and inductive; that explore past studies from different perspective (Crowther & Lancaster, 2009; Saunders et al., 2009; Åsvoll, 2014) . Furthermore, with regards to methodology of pragmatism, there are strong epistemological limitations tied to inductions in interpretative qualitative methodology. Although the present study seeks to explore CSFs that has already been discussed from different perspective new knowledge is required hence the reason for abductive approach that can combine both approaches to provide insight to the phenomena with no loyalty given to any alternative paradigm (Mackenzie & Knipe, 2006b).

RESEARCH METHOD & STRATEGY

This study aimed to establish the correlative relationship between the dependent variable and independent variables and from descripto-exploratory nature. Data needed is first collected in-depth from existing literature and reported in the Epizitone & Olugbara (2019) study. Then secondary, though a web-based data collection tool which is then subsequently utilized for further advance impact analysis.

The abductive approach assumption of which is used in this study, according to Saunders et al. (2009), is a combination of deductive and inductive approaches, which moves back and forward. This approach strategy is usually associated with a survey by which the deductive approach places emphasis on the quantification of data collection and analysis. This research survey incorporates a cross-sectional design whereby data are predominantly at one stage collected through a questionnaire to receive quantifiable data in association with the independent variables (CSFs) and dependent variable (ERP financial system implementation) of this study. By using a survey design which is highly efficient in obtaining precise information from study population authors have been capable of describing different characteristics associated with the population, test relationship and assumptions.

METHODOLOGICAL CHOICE

In literature research method and research methodology are distinctive concepts (Wahyuni, 2012). Methodology is concerned with how we reason causally, looking at what notions guide model building and model testing, models that should be constructed and empirically tested, depending on the research question at the moment (Johnson et al., 2019). Analogically, a methodology can be seen as a domain or a map, whereas a method refers to a set of steps to journey between two locations on the map (Jonker & Pennink, 2010). According to Wahyuni (2012), a model to conduct a research within the context of a particular paradigm refers methodology which encompasses the underlying sets of beliefs that guide a researcher to select one set of research methods over another. While research method consists of a set of specific procedures, tools and techniques to gather and analyze data.

Wahyuni (2012), report methodologies to be a closer research practice as philosophy is to paradigms while highlighting the independency of a research method which is atheoretical from methodologies and paradigm. Indicating research methods such as interview, survey and experiment to be different from research methodologies which is the theoretical and ideological foundation of a method whereas method is the practical application of doing research. Hence, the importance of the research design to link a methodology and a correct set of research methods in order to address questions and or hypotheses of the research that are established to examine social phenomena.

According to Denscombe (2008), the research world consists of three paradigms namely: quantitative, qualitative and mixed methods, each is based on a system of philosophical convictions, which are either positivism, constructivism and pragmatism, respectively. There are two distinct discourses in literature regarding qualitative and quantitative that are often used: research paradigm and research methods. The first discourse focuses on the nature of knowledge, one's understanding of the world and the final purpose of the research whereas the second refers to the method used to collect and analyze data and the type of presentation and generalization of obtained from the data (Mackenzie & Knipe, 2006a).

Qualitative research is dependent on collection of qualitative data, such as words, pictures, or icons analyzed using thematic exploration (Mackenzie & Knipe, 2006a; Johnson & Christensen, 2008). Qualitative researcher uses a deep and wide angle lens for examination in order to prevent the intervention of natural flow, hence, employing the use of non-numerical data analysis and collection techniques (Mackenzie & Knipe, 2006a; Saunders et al., 2009). Furthermore, qualitative methods are most applied given that they are most fitting for gathering of values, perceptions, peoples' experiences, purposes and context specificities due to their paradigm devotion to in-depth examination (Iofrida et al., 2018a)

By disparity, quantitative research can be seen as a collection of numerical data and exhibition of the relationship view between the empirical findings and theory (Wahyuni, 2012). Quantitative research follows characteristics of a quantitative research paradigm involving the use of statistical analysis to comprehend and interpret numerical input (Johnson & Christensen, 2008).

The aforementioned explanation of the two-research method, elucidates the reason behind the researcher decision to adopt a mixed method that combines both methods in a research study. According to literature mixed-methods being more common and acceptable to the research approaches have become more complex in design and more flexible in their application of methods. A mixed methods approach to research is one that involves assembling both numeric information on instruments and as text information on interviews or observation (Mackenzie & Knipe, 2006a). According to Johnson et al. (2019), mixed methods research (MMR) can address the timeless issue of cause-and-effect or causation. Iofrida et al. (2018a), highlight the potential of both methods in a research paradigm and in line with qualitative and quantitative study, the researcher utilizes both at the three different phases of the study.

Phase one involved both qualitative and quantitative approaches; Taking qualitative research to illustrate a penchant for nominalism in reporting findings for particular people, groups, places and object. Following a systematic review step an extensive literature review is conducted within the content scope to investigate and obtain an in-depth quality and understanding of a phenomenon. While the quantitative research of phase one to indicate a liking for Universalism in the form of variables. The knowledge obtained from the above application of qualitative method is then used by the researcher determine the CSFs that will be contextualized in the study for ERP implementation (Epizitone & Olugbara, 2019). Additionally, the researcher will conduct a frequency analysis followed by which factor analysis will be applied to extract a set of critical success factors. The next phase two of the study, the researcher use the qualitative approach to gather data in the form of preference chains adopted from Thompson et al. (2018) study from participants whose answers are based on their own experience and knowledge. Thereafter, the last phase three, to identify the most critical factors, and bring into line the statistical measures to a quantitative study of ADVIAN classification tool which is utilized by the researcher.

TIME HORIZON

Research study can either be cross-sectional and longitudinal which is what determines the time horizon (Saunders et al., 2009). Studies conducted over a short period of time are considered to be cross-sectional, whereas longitudinal studies are the conducted over a longer period. The emphasis of research study is on a specific phenomenon at one particular time frame. Henceforth, this study is a cross-sectional study as is done over a brief time in months. Although, it could be contended that this study nature, to explore the financial subsystem of ERP system would have been appropriate for a longitudinal study as long-term research can describe development and changes. Due to time scarcity common with many undertaken research projects adopting cross-sectional study for this research's aim is acceptable as it doesn't require working with the phenomena over time.

CONCLUSION

This study stemmed from the need to present a setting of the research process to adopt in the CSF and ERP area and relative fields. We methodically examined research topics, paradigms, and methodical approaches elements of research process in two leading online academic journals database of the research area. We have discussed comprehensively the different elements involved in the research process through the adoption of a mixed method approach in determining critical success factors for enterprise planning resource system implementation in the different phases of the study.

Hence, it is evident from literature that the Mixed method approach has been embraced by many researchers as the best practice approach to tackle and realize research objectives. The enactment of Mixed Method approach has been adopted by several authors already in solving complex research objectives to produce the desired. Furthermore, Barmeyer et al. attest to the awareness already in existence among researcher for mixed method application producing reliable research results. Rapport & Braithwaite further support mixed method stand by highlighting the incorporation of mixed method with real time data collection tools which are executed in the phase two of achieving this study. While other authors such as Kaplan, advocate for the importance of mixed method specifically diversify methodology, Shannon-Baker, emphasized the need to be united for diverse mixed method not limited to a single best as there is none.

This paper presents a framework for the adoption and adaptation of mixed method which furthermore, aid researcher caught in the web of research process dilemma advance to the subsequent phase and complete their research. Although this paper mainly discussed research elements in favor of the mixed method approach, future works adopt, execute and discussed practical implementation of the research elements selected.

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