Developing a Conceptual Framework for Quality Research in Built Environment

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Received: 15/01/2025 **Revised: 20/02/2025** **Accepted: 24/03/2025**

Conceptual models synthesize knowledge, identify gaps, and enhance understanding. However, developing them with ad-hoc approaches risk incompleteness due to challenges in tracking information. This paper explains how conceptual frameworks can guide quality research in built environment, improving coherence and rigor in addressing research problems. This study utilised an argumentative research strategy that enhances academic discourse by clarifying, contesting, or augmenting current knowledge. It helps researchers to clarify or reinterpret pre-existing ideas and is especially useful in disciplines there are variety of interpretations or points of view. There is paucity of literature to assist the beginner researcher in comprehending the concept of a conceptual framework and its application in research. This study illustrates the methodology for researchers to formulate and integrate a conceptual framework within a research project, the rationale for this endeavour, and the subsequent development of a conceptual model. Generally, creating a conceptual framework improves clarity, directs the investigation, and guarantees a methodical approach to research problem. It facilitates the integration of theory with practice, enhancing the overall quality, rigour, and consistency of the study findings. Creating a conceptual framework for quality research in built environment presents an innovative method by systematically structuring theoretical and empirical insights, directing research design, and identifying gaps, thereby improving clarity and rigour in a field frequently confronted with intricate, multidisciplinary challenges.

Keywords: conceptual framework, doctoral, novice researcher, thesis, variables

Introduction

A conceptual framework is crucial to empirical research. According to Ravitch and Riggan (2017), conceptual framework serves as a cohesive structure that helps researchers to carefully bring all the components of a study together. It also serves as a guide and stabilising force in research. It elucidates the links among these elements, emphasising gaps, intersections, conflicts, and the contextual factors that affect both the research environment and the examination of phenomena within it. A conceptual framework illustrates anticipated findings from research, including the relationships among the considered variables. The utility of developing a conceptual framework is contingent upon the nature of your research. Conceptual frameworks are very prevalent in research that entails hypothesis testing. A framework can be employed to evaluate your ideas or investigate the scientific validation of a certain concept. In our view, it serves as the cornerstone of all academic endeavours and the conceptual framework from which the research will be conducted through the writer's perspective. Additionally, it delineates the parameters for analysis and data acquisition during the data collection process.

All scientific knowledge is predicated on the contributions of preceding scholars. No scientific concept possesses complete originality that holds lasting significance. Empirical research or evidence-based inquiry is founded on generations of accumulated knowledge. Experiments evaluate and confirm previous research. While scientific inquiry refines, adjusts, replicates, and critically evaluates the underpinnings of knowledge. Consequently, foundational knowledge or "theory" serves as the foundation upon which scientists construct their enquiries. Furthermore, it is essential to remember that the authors of theses and dissertations are students. These individuals are emerging scholars, and their training is inadequate without a comprehensive examination of the foundational principles and frameworks behind their research. Without at least a superficial understanding of the preceding investigations that underpin their own research, individuals cannot be regarded as integral members of the scientific community. To substantiate a modern scientific inquiry, it is essential to possess a comprehensive awareness of the connection between current practices and the continuum of knowledge that has culminated in the present examination. This

comprehension is essential for a student prior to becoming a fully-fledged scholar in that field.

Developing and employing a conceptual framework is not straightforward, as it is not readily available in the literature for researchers to exploit (Maxwell, 2012). The challenge of comprehending theoretical and conceptual frameworks is exacerbated by the absence of a shared terminology concerning these concepts (Leshem & Trafford, 2007). Theoretical frameworks are occasionally termed conceptual frameworks (Ocholla & Le Roux, 2011; Maxwell, 2013). Ravitch and Riggan (2017) asserted that a theoretical framework constitutes a component of a conceptual framework. The application of the two phrases differs across various researchers and academic traditions. This study centres on the conceptual framework, emphasising the necessity of comprehending its definition, constituent elements, their interactions, and their application in directing high-quality, rigorous research.

Despite numerous efforts by researchers to explain the conceptual framework in literature, it remains perplexing for students especially in built environment regarding its application, hence necessitating more exploration and understanding of the underlying reasons for this ongoing issue. This study addresses these difficulties by elucidating the conceptual framework as a vital instrument to aid postgraduate students in structuring their work through the comprehensive mapping of their research plan. It enhances the pedagogical discourse regarding the instruction of intricate subjects in research works by suggesting a model that may significantly improve the educational experience for PhD students. It can be detrimental to students' capacity to comprehend how their study fits into the larger context of existing knowledge in the field, in our opinion, to require them to prepare research theses before they have a good grasp of how a conceptual framework, reinforced by pertinent theories, informs their work. This underscores the significance of this paper.

Research Approach

Argumentative research approach is progressively acknowledged as a significant strategy across multiple fields. According to Metcalfe and Powell (2003), research is presented as a coherent and well-reasoned argument that frequently incorporates a variety of empirical evidence formats. Argumentative research approach is an academic strategy that emphasises the formulation, presentation, and analysis of arguments concerning a study issue. It is widely used in disciplines such as philosophy, law, social sciences, and humanities, where reasoning, persuasion, and critical analysis are essential (Creswell & Creswell, 2017). This approach can substantially improve research design and acceptance, especially in disciplines such as construction management where the exchange of ideas and thoughts is encouraged. Argumentation theory enhances research approach by substantiating questions, hypotheses, and procedures (Mercier & Sperber, 2011). This emphasises the perspective of Metcalfe and Powell (2003), who contended that perceiving research as an argumentative process improves both the quality and experience of research by fostering eclectic methodologies, describing terminology, differentiating between reasoning as a method and communication strategy, and motivating researchers to concentrate on their audience.

An argumentative technique is predicated on a well articulated research question or thesis that presents a debatable issue or position. The researcher intends to assert a stance on a contentious issue and construct a persuasive argument to substantiate it. According to Punch and Oancea (2014), the argument is supported by statistics, empirical evidence, literature, historical examples, or theoretical models. The argument's strength is mostly dictated by its logical coherence and the quality of its supporting evidence. Persuasion is an essential component of argumentative research, necessitating rhetorical proficiency to convey and substantiate the case effectively (Booth *et al*., 2008). The approach uses organised logic and a clear presentation to not only provide information but also persuade the reader that the main argument is true (Toulmin, 2003). Embracing argumentative stance aids researchers in confronting issues such as originality and the development of their academic voice (Wentzel, 2017). Distinguishing between research methodologies and methodology is crucial for enhancing the quality of academic research, particularly in fields like construction management. Integrating interpretive methodologies with a solid methodological framework can facilitate equilibrium in research activities (Edum-Fotwe *et al*., 1996).

The argumentative research strategy significantly enhances this research by providing a structured approach to clarify, contest, and augment current knowledge about conceptual frameworks in construction management research. This strategy is particularly effective in addressing the complexity and varied interpretations surrounding conceptual frameworks, especially for novice researchers and PhD students. By employing an argumentative approach, the research is able to systematically present and analyse different perspectives on conceptual frameworks. This allows for building a compelling case for the importance of these frameworks in research. The strategy enables the research to address common misconceptions and challenges faced by researchers when developing conceptual frameworks, thereby contributing to a clearer understanding of the topic. The argumentative strategy also facilitates the integration of diverse sources of

information and viewpoints. By synthesizing insights from philosophy, systems theory, and research methodology, we are able to create a comprehensive and interdisciplinary understanding of conceptual frameworks. This approach helps to bridge the gap between theoretical knowledge and practical application, making the research more relevant and accessible to a wider range of audience.

Furthermore, the argumentative strategy allows for a critical examination of existing practices and propose improvements. By presenting a step-by-step process for developing conceptual frameworks, we do not only argue for their importance but also provide practical guidance for researchers. This combination of theoretical argumentation and practical application strengthens the overall impact of the research. The strategy also enhances the research by encouraging a more rigorous examination of the topic. Through argumentation, we are able to anticipate potential counterarguments and address them proactively. This results in a more robust and well-rounded discussion of conceptual frameworks, increasing the credibility and persuasiveness of arguments.

Lastly, the argumentative approach aligns well with the goal of advancing academic discourse in the field of built environment research. By presenting a clear and well-reasoned argument for the use of conceptual frameworks, the research contributes to ongoing debates and discussions in the field. This not only enhances the immediate research but also stimulates further inquiry and dialogue among researchers. The argumentative research strategy significantly enhances the research by providing a structured approach to analyse, synthesize, and present complex information about conceptual frameworks. It allows for a comprehensive examination of the topic, facilitates practical application, and contributes to advancing academic discourse in built environment research.

What is a Conceptual Framework in Research

The phrase "conceptual framework" originates from philosophy and systems theory, first articulated in the 1930s by philosopher Alfred North Whitehead. In the 1950s, systems theorist Ludwig von Bertalanffy proposed the concept of "general systems theory," positing that all systems include common features that may be analysed. Due to a lack of research on the subject and the frequent interchange of terms such as theoretical framework, logic model, and concept maps, conceptual frameworks in qualitative research have historically been a little hazy (Ravitch & Carl, 2019). Ngulube *et al*. (2015) contended that the phrase "conceptual framework" is paradoxical, as ideas are abstract and theoretical, aiding our comprehension of the real world while remaining merely theoretical designations. A conceptual framework depicts the relationship between concepts and their impact on the topic being investigated. Several authors have defined it, including Walt and Potgieter (2012), who described it as a tool for explaining the important characteristics, causes, and correlations to be researched in either a visual or narrative format. Lester (2005) further defined a conceptual framework as an argument that the selected concepts and their expected relationships are appropriate and beneficial for the research subject at hand. According to various definitions and perspectives found in the literature, a conceptual framework is made up of essential concepts, variables, relationships, and assumptions that influence academic study. It provides a theoretical framework for data analysis and interpretation. Drawing on current theories and expertise, it aids in defining the research scope, identifying relevant variables, formulating research questions, and guiding the selection of methodologies and data analysis procedures.

Importance of conceptual framework in construction management research

A conceptual framework illustrates the practical and theoretical importance of a research issue and delineates how the methodologies will tackle the research concerns (Zackoff *et al*., 2019). It functions as a mechanism for synthesising knowledge from established domains while producing novel insights. According to Ravitch and Riggan (2017), it aids in directing researchers as they situate their work within a field, investigate unique settings, issues, or frameworks, and clarify the originality and contributions of their study. The conceptual framework serves as a compass, coordinating methods and analytical instruments with research topics to improve validity and rigour. It situates the research within theoretical, practical, and social settings, recognising the researcher's identity and positionality. As comprehension advances, the conceptual framework develops, becoming increasingly refined and sophisticated, thereby assisting researchers in making informed decisions on methodologies and theories (Miles *et al*., 2014).

A conceptual framework needs to be regarded as a dynamic, ongoing process rather than a definitive outcome. It evolves via a sequence of nonlinear phases and assumes many shapes, influenced and enhanced by the research it underpins (Ravitch & Riggan, 2017). The framework assists researchers in defining and articulating essential constructs, examining their intersections, and contextualising their study within diverse situations. It includes guiding theories, objectives, and both formal and informal frameworks that facilitate the comprehension and contextualisation of the study's topic. The approach improves the depth and integration of the research by addressing overlaps and gaps within fundamental components (Ravitch &

Carl, 2019). It assists researchers in situating themselves within the study by considering epistemological, ontological, and axiological considerations, which subsequently affect their methodological choices. A conceptual framework is perpetually constructed and enhanced during the research process, directing and adapting alongside the study.

The conceptual framework is crucial in construction management research, establishing a basis for investigations, enhancing knowledge, and influencing research approaches (Oppong, 2013). It allows researchers to link their research enquiries to overarching theoretical concepts and underscore the significance of their contributions (Oppong, 2013). The conceptual framework has been utilised in construction across multiple domains, including the management of design alterations (Yap *et al*., 2016), performance assessment and oversight (Sonson *et al*., 2017), and simulation modelling (Abdelmegid *et al*., 2017). For instance, it has facilitated the identification of pivotal factors influencing project performance, such as the repercussions of design alterations on temporal and financial overruns (Yap *et al*., 2016), bolstered the formulation of extensive performance measurement systems for construction firms (Sonson *et al*., 2017), and augmented stakeholders' confidence in simulation models via refined conceptual modelling frameworks (Abdelmegid *et al*., 2017). The conceptual framework provides numerous advantages to study. It aids researchers in recognising and formulating their perspective on the topic under investigation (Grant & Osanloo, 2014).

Developing a conceptual framework

For a conceptual framework to be constructed and continuously developed in research, it is essential to comprehend its roles and significant (Adom *et al*., 2018). Researchers typically initiate their enquiries by investigating research topics, objectives, and questions, utilising the conceptual framework to analyse the natural world of the subject—perceiving the study as a complex system with interrelated components (Ravitch & Carl, 2019). This viewpoint emphasises the interconnections and interdependencies among various components of the research. Designing and carrying out research requires a conceptual framework that embodies methodological criticality by methodically connecting theory with empirical work and considering the positionality, goals, assumptions, and social identity of the researcher (Nglube *et al*., 2015; Ravitch & Carl, 2019). Developing a conceptual framework is essential in quantitative, qualitative, or mixed methods research, as it offers structure and enhances credibility (Nglube *et al*., 2015; Straughair, 2019). This method encompasses iterative phases, including the formulation of research questions, literature evaluation, framework design and diagramming, operationalisation, study execution, and necessary adjustments (Helitzer *et al*., 2014). According to Staughair (2019), when constructing a framework, researchers had to consider their personal interests, ongoing research subjects, and theoretical viewpoints. According to Jabareen (2009), the technique is flexible and prioritises comprehension over predicting results. Conceptual frameworks can serve as a basis for program theory and guide the formulation of interventions (Helitzer *et al*., 2014). While numerous specific frameworks exist, comprehensive principles for their construction are less commonly addressed in the literature (McTaggart, 2021). Although it can be tough for inexperienced researchers, a well-defined methodology can ease the process and aid in the advancement of research knowledge (Straughair, 2019; Helitzer *et al*., 2014).

Conceptual framework links with research questions and variables

Developing a conceptual framework is an attribute that researchers should possess. Essential resources to establish a conceptual framework encompass selecting pertinent research questions, delineating the many types of variables involved, and establishing the cause-and-effect linkages.

Developing research questions

A conceptual framework links the important components of a study that you are aware of, concerned about, and value with other facets and impacts of the research (Ravitch & Riggan, 2016). The research topic is fundamental to your study, guiding all elements of your research process. It influences the design, technique, and analysis of your study, guaranteeing that each element corresponds with your research aims. Formulating a precise research question is essential since it elucidates the focus of your inquiry and dictates the methodology of your analysis. To achieve this, a researcher should begin with a wide field of interest and utilise background research to gradually narrow it down using a funnel-like method. The purpose of the research must be well-defined, precise, and answerable, considering its importance and originality. Soliciting input is equally crucial.

Conceptual framework in variable selection

Conceptual frameworks offer a structured method for selecting and arranging variables, allowing researchers to evaluate the links between factors and results efficiently. They support targeted, in-depth research. The dependent variable is the primary outcome to be assessed or forecasted, whereas independent variables are elements that may affect it. The selection of these variables must correspond with research objectives, the

study's nature, and its design, and should be guided by current literature, theories, or personal observations.

Analysing cause-and-effect dynamics

A conceptual framework delineates anticipated relationships among variables, establishes research objectives, then synthesises those objectives to derive logical conclusions. It must be formulated prior to the commencement of data collection and is crucial for structuring intricate concepts, directing research, and delineating cause-and-effect linkages (van der Waldt, 2020). Utilise visualisation methods such as path diagrams, cause-and-effect matrices, time series plots, scatter plots, bar charts, or heatmaps to effectively explain these linkages.

Conceptualising research influencing variables

A conceptual framework is crucial for structuring thoughts and comprehending the interrelations among variables in research (Durbarry, 2017; Kusnadi, 2010). It guides the research process by linking concepts via models and theories to evaluate hypotheses using empirical evidence (Durbarry, 2017). Moderating and mediating factors are frequently used in quantitative research to make complex interactions between independent and dependent variables more understandable (Sajeevanie, 2020). The framework evolves during the research process, encompassing literature review, composition, discourse, and introspection (Kusnadi, 2010). By addressing the "why" and "how," it helps researchers to go from merely describing occurrences to explaining them (Durbarry, 2017). According to Durbarry (2017) and Kusnadi (2010), the complexity of the framework varies depending on the type of research, but it is essential for formulating research questions, choosing a technique, and beginning data analysis.

Typical illustration of a conceptual framework construction

Following the selection of a research topic, a prospective PhD student reviews the literature to discover key concepts utilised in relevant studies before starting to construct a conceptual framework for their PhD research. This technique enables the novice researcher to comprehend prior studies and to pinpoint "gaps in the literature," indicating areas need further study. These gaps may arise from explicit demands for action in the literature or from the understanding that the proposed issue has not been examined in a specific setting. The student needs to use these gaps to either substantiate an existing issue or to develop a new research topic. Students should only utilise academic sources at this stage to guarantee their contributions enhance the existing body of knowledge. Following a comprehensive literature review, the student should commence the extraction of pertinent variables, concepts, theories, and frameworks addressed in the literature. The development of the conceptual framework entails establishing the relationships among these components in relation to the study problem. The issue may stem from a contextual barrier, a pragmatic necessity, or the potential to further a certain field of inquiry or application.

Students should understand that a conceptual framework cannot be obtained directly from the literature; study would not be necessary if an existing framework had already addressed the issue to the fullest extent possible. The student's research will determine the components of the framework. Creating a pictorial representation of the conceptual framework is advisable, while it is not mandatory. Visualising the framework will clarify the research process, which is crucial for a logical research roadmap. The framework should also present the study's methodological approach and show how the research variables may affect the results. As the research advances, it may be essential to modify the framework. The next paragraph gives the illustration on how to construct a framework in research.

In addition to the dependent and independent variables, a conceptual framework may include other types of variables. For example, there could be a moderating and a mediating variable; the moderating variable impacts the strength or direction of the association between an independent and a dependent variable, whereas the mediating variable describes how the independent variable influences the dependent variable. Similarly, the framework could contain control or confounding factors. The control variable is held constant to avoid external factors from impacting the connection, whereas the confounding variable is an unmeasured variable that is connected to both the independent and dependent variables and may influence the results. After understanding this, explore the following illustration to gain a better understanding of how to develop a conceptual framework, particularly for beginning researchers. Assume that the aim of a study (hypothetical) is to investigate the impact of work-life balance on employee job commitment in a construction company. After conducting a literature search, the researcher may discover that a satisfied worker is more likely to be committed to his job and then decide to investigate whether job satisfaction (mediating variable) of employees can explain how work-life balance (independent variable) affects job commitment (dependent variable) and whether management support systems (moderating variable) modify how the independent variable affects the dependent variable. A confounding variable, such as an employee's organisational status, is a potential element that may influence both work-life balance and job commitment. These variables must be considered and controlled

together with the employee's age to guarantee that any observed results are attributable only to the impact of work-life balance. The explanation offered here is more relevant to quantitative or mixed methods research. However, in qualitative investigations, the framework generally lacks arrows or lines indicating causal or correlational relationships. This explanation is shown in Figure 1. The figure illustrates the conceptual framework of the hypothetical example which shows the diagrammatic presentation of constructs (variables) and the hypothetical paths depicts the logical relationships between the independent, mediating, moderating and dependent variables.

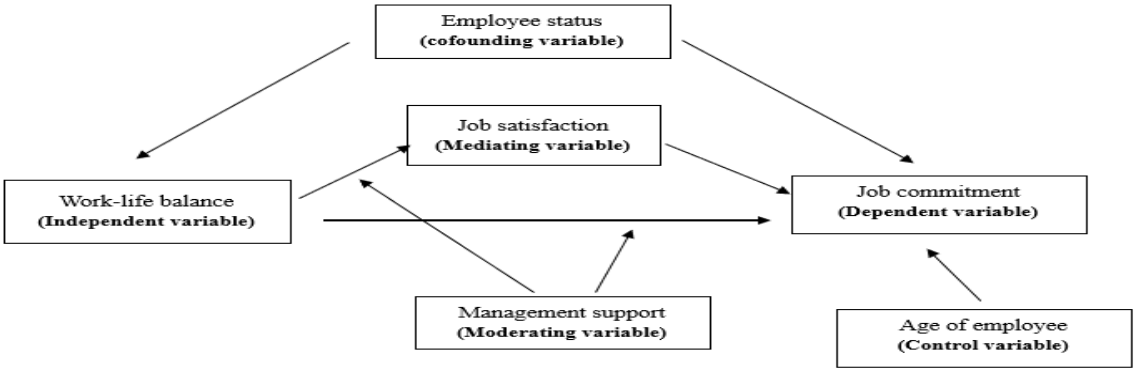

Figure 1: Illustrating conceptual framework with the variables

Developing hypothesis from conceptual framework

Creating a conceptual framework is essential in research since it shapes hypothesis formulation and directs the whole study design. This method entails synthesising current research, identifying knowledge gaps, and linking diverse concepts through models and theories (Durbarry, 2017; Grames *et al*., 2022). Hypotheses are explanations of events that propose causal links, regardless of whether the underlying mechanisms are explicitly articulated (Betts *et al*., 2021). A hypothesis articulates a logical relationship between two or more variables and is formulated as a testable assertion. A robust hypothesis must fulfil several criteria: it should be tested, adequately explanatory, and superior to other possible explanations. A hypothesis might be non-directional, meaning it just indicates an association without describing it, or directional, meaning it suggests a particular relationship between variables.

A hypothesis must meet a few essential requirements to be tested, including having a plausible probability of being true, reproducible. outcomes, and falsifiability. In the absence of these conditions, the hypothesis would lack specificity, rendering any subsequent study incapable of producing significant conclusions. Consequently, a hypothesis must be tested, with at least one criterion well fulfilled to substantiate the results. The creation of a conceptual framework and a hypothesis constitutes the basis of scientific investigation. It is crucial to comprehend the theoretical underpinnings and the structure of the hypotheses before beginning any kind of study. Hypotheses, which suggest causation, can be represented through Directed Acyclic Graphs (DAGs), with each node symbolising a notion and the arrows denoting the causal relationships and direction of effect (Laubach *et al*., 2021) as seen in Figure 2.

Grames *et al*. (2022) observe that a basic Directed Acyclic Graph (DAG) can illustrate a singular causal relationship, exemplified by A → B, where A serves as the independent variable and B as the dependent variable, signifying that A accounts for B. Nonetheless, more intricate models may incorporate mediators or supplementary variables. A directed acyclic graph (DAG) may illustrate a mediating variable with the sequence A → C → B, or it may include other variables influencing the interaction, such as A → B ← D (where D serves as a control variable). In a more complex scenario, an additional variable may affect both the independent and dependent variables, as illustrated by E → (A → B), where E serves as a moderating variable.

Each Directed Acyclic Graph (DAG) signifies a hypothesis or a collection of hypotheses explaining a certain phenomenon. Depicting hypotheses as Directed Acyclic Graphs (DAGs) offers a systematic framework that enhances the examination of the interconnections among the variables. Researchers are urged to delineate hypothetical pathways informed by the theory, aligned with their study's objectives and selected approach. Each hypothesis must be formulated as a causal pathway (e.g., A → B) that may be depicted in a Directed Acyclic Graph (DAG), including all pertinent concepts and intervening processes as required. Figure 2 employs a

Directed Acyclic Graph (DAG) to elucidate the relationships among variables: A signifies work-life balance, B represents job commitment, C indicates job satisfaction, D defines employee age (control variable), and E reflects manager support.

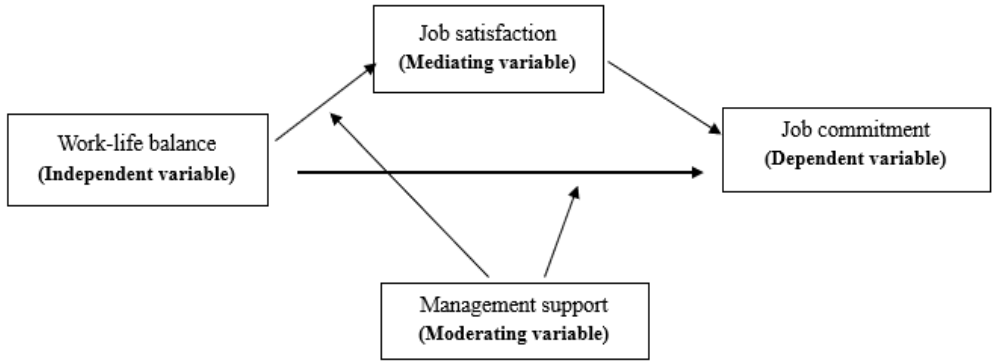

Figure 2: Conceptual framework showing the hypothetical paths

We can now state the hypotheses based on the illustration in Figure 2 that:

H1: Work-life balance has negative influence on employees' job commitment

H2: Work-life balance has positive impact on Job satisfaction

H3: Job satisfaction mediates the relationship between work-life balance and job commitment

H4: Job satisfaction will positively influence job commitment

H5: Management support positively moderates the relationship between work-life balance and job satisfaction

H6: Management support positively moderates the relationship between work-life balance and job commitment.

Choosing the right analytical tools for testing the hypothesis

Selecting suitable analytical instruments for hypothesis testing is essential in research. The nature of the hypothesis a researcher constructs is contingent upon the research question and methodology. Common hypotheses in literature encompass the null hypothesis, which asserts the absence of a relationship or difference between variables, and the alternative hypothesis, which contends that a relationship or difference exists. Hypothesis testing employs statistical techniques to ascertain whether sufficient evidence exists to affirm or refute a certain hypothesis for a study parameter, based on a data sample.

Data analysis techniques differ according on the hypothesis. Numerous statistical tests, including t-tests, F-tests, and ANOVA, are employed for hypothesis testing, and their proper application is crucial for obtaining accurate results (Kaur, 2015); meanwhile, inferential analysis, such as correlation or regression, facilitates the generalisation of results and hypothesis testing. Additionally, second-generation statistics may be employed based on the overarching aim of the research. These tools denote more sophisticated analytical methodologies that surpass conventional (first-generation) procedures such as correlation, regression, and ANOVA. These instruments are employed in intricate research contexts, such as evaluating several relationships concurrently, managing latent variables, or modelling data that deviates from traditional assumptions. These instruments comprise Structural Equation Modelling (SEM) amalgamates factor analysis and regression to assess complex models comprising several dependent and independent variables. Partial Least Squares Structural Equation Modelling (PLS-SEM), a variant of Structural Equation Modelling (SEM), is especially advantageous for small sample sizes or when the data fails to satisfy normality criteria. Generalised Linear Models (GLM) enhance conventional linear regression by incorporating response variables with diverse distributions, including binomial and Poisson. Bayesian Analysis integrates prior knowledge into the evaluation, revising probability estimates as new evidence emerges. Time Series Analysis employs methodologies such as ARIMA (AutoRegressive Integrated Moving Average) to examine time-based data, facilitating the identification of trends, seasonal patterns, and autocorrelation.

Consequently, selecting the suitable statistical procedures necessitates evaluating the study's hypothesis, data type, scope, and the assumptions and constraints of the tests. Considerations such as data reliability, interpretative clarity, and result relevance should inform the decision-making process. There are two sorts of errors that can arise in hypothesis testing: Type I error and Type II error. A Type I error, or false positive, occurs when a researcher incorrectly rejects a

genuine null hypothesis. A Type II error, or false negative, transpires when a researcher does not reject a false null hypothesis. To mitigate the probability of these errors, it is imperative to meticulously organise the study, choose appropriate statistical tests, and interpret the results with precision. Furthermore, researchers must acknowledge the study's limitations and consider potential sources of mistake before drawing results.

Conclusion

The purpose of this paper is to clarify the process of developing a conceptual framework for high-quality research in construction management. The process begins with the deductive assumption that a problem exists, followed by the application of methodologies, models, and theories to address it. The paper tackles a common problem encountered by early-career PhD students and some supervisors: confusion over conceptual frameworks. It emphasises that a conceptual framework is not readily available in the literature; rather, it is something that the researcher must comprehend and construct in order to lead their research. Conceptual frameworks are frequently overlooked in academic discourse, maybe because seasoned scholars regard them as second nature or due to uncertainty in nomenclature. Many PhD proposals do not adequately describe the term "conceptual framework," which is critical for organising and guiding research. The paper contends that frameworks should be regarded as critical components of research and included in study design. Visual models can assist others comprehend frameworks, and more discussion about the distinctions between concepts and theories would improve researchers' grasp of these nuances. Frameworks should be considered as instruments to help beginner researchers, rather than impediments to credibility.

The study offers helpful advice to PhD students who frequently struggle with library searches and achieving their supervisors' expectations for conceptual frameworks. It concludes that a strong thesis should have a conceptual framework to promote research clarity and rigour. While presenting a framework is optional, it plays an important function in defining the inquiry. To strengthen the research, each dissertation should include sections on both theoretical and conceptual frameworks, as per university rules.

This article is limited by its predominant emphasis on quantitative and mixed methods approaches (particularly sequential mixed methods), at the expense of qualitative research. Researchers can develop hypotheses and improve standard literature reviews by combining different studies or theories from the literature. This approach is beneficial to research in construction management and other fields by assisting in the development of structured conceptual frameworks. The paper suggests choosing a good research topic based on advanced theoretical literature, which will encourage researchers to employ conceptual frameworks effectively for improved comprehension and research outcomes.

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