



ASSESSMENT OF CONSTRUCTION PROFESSIONALS' AWARENESS OF THE VUCA MODEL IN BUILDING CONSTRUCTION FIRMS FOR ENHANCED MANPOWER OPERATIONS

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Abstract: This study investigates the level of awareness of the Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) model among construction professionals. It examines its implications for manpower operations in building construction firms in Nigeria. Utilizing a quantitative research design, data were collected via structured questionnaires distributed to 240 professionals, including architects, builders, civil engineers, and quantity surveyors in Abuja. Descriptive statistical methods, including mean scores and standard deviations, were employed to assess awareness across the four VUCA dimensions. The results indicate that professionals demonstrate an overall moderate level of VUCA awareness, with greater familiarity regarding volatility and uncertainty than with complexity and ambiguity. Although dynamic and unpredictable project environments are acknowledged, a substantial gap persists between conceptual understanding and practical application in workforce planning and management. The findings suggest that manpower operations are not yet fully optimized to address VUCA-related challenges, which have an adverse impact on project performance in terms of cost, time, and quality. The study concludes that improving VUCA literacy through targeted training, adaptive leadership development, and the integration of flexible manpower strategies is critical for enhancing workforce efficiency and resilience. It further recommends the implementation of scenario planning, systems thinking, and digital decision-support tools to strengthen manpower operations and better align them with the evolving demands of the construction industry.

Keywords: VUCA model, manpower operations, workforce management, volatility, construction professionals, workforce planning.

1.0 INTRODUCTION

Manpower operations in contemporary construction firms face increasing challenges due to the volatile, uncertain, complex, and ambiguous (VUCA) nature of the operating environment. Project demands, supply chains, and stakeholder expectations are evolving rapidly. The VUCA framework serves as an analytical tool for examining how external pressures, such as fluctuating material costs, regulatory changes, and market instability, interact with internal workforce planning, skills development, and deployment strategies (Syamsir et al., 2025). While existing studies indicate that construction managers are generally aware of volatility and uncertainty, the application of this awareness to proactive and resilient

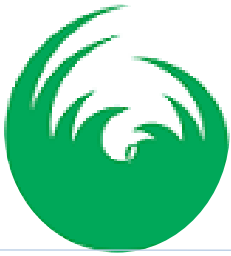
manpower practices remains inconsistent. This inconsistency is particularly evident in the construction sector, where project interdependencies and fragmented information flows increase operational complexity. Strengthening VUCA literacy among construction professionals through scenario planning, agile staffing, systems thinking, and ambiguity management is increasingly recognized as essential for sustaining project delivery, quality performance, and cost efficiency in rapidly changing environments (Hendratmi et al., 2022; Friðgeirsson et al., 2021; Evans & Trąpczyński, 2023; Alfandri et al., 2024). Accordingly, there is a need to understand how VUCA awareness can be leveraged to enhance manpower operations in building construction

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firms (Castillo & Trinh, 2019; Friðgeirsson et al., 2021; Horstmeyer, 2020).

Although VUCA is increasingly recognized as a defining characteristic of modern organizational environments, empirical evidence remains limited regarding how professionals' awareness of VUCA leads to measurable improvements in manpower management, particularly within Nigerian construction practice. There is a lack of clarity about which VUCA dimensions most significantly affect workforce planning, deployment efficiency, and capability development in Nigeria, as well as which contextually appropriate strategies are required to translate awareness into resilient and cost-effective project outcomes (Friðgeirsson et al., 2021; Giones et al., 2019; Evans & Trąpczyński, 2023; Alfandri et al., 2024).

Addressing this gap requires examining the level and distribution of VUCA awareness among construction professionals and assessing how each dimension relates to manpower performance indicators. This approach supports the development of evidence-based strategies for cultivating a VUCA-responsive workforce in Nigeria's building sector. The inquiry is grounded in literature that highlights sector-specific dynamics, such as the role of Building Information Modelling (BIM) in Nigerian construction (Olugboyega, 2019), challenges in BIM integration within polytechnic education (Ebekozi et al., 2024), local content and sustainability frameworks (Nwosu et al., 2006), and insights into prefabrication and modular construction adoption (Adindu et al., 2020). Collectively, these studies emphasize the need to align VUCA-related competencies with Nigeria's institutional, educational, and industry-specific contexts (Kilanko & Oladiran, 2023; Obeagu, 2020).

The Nigerian construction sector operates in a highly dynamic and unpredictable environment, marked by unstable input prices, policy inconsistencies, and shifting market conditions. These factors reinforce the relevance of VUCA as an analytical framework for manpower management. However, the lack of robust empirical connections between VUCA awareness and workforce outcomes limits stakeholders' ability to design targeted, context-sensitive interventions. A Nigeria-focused perspective is essential, considering the impact of local

factors such as the evolving adoption of BIM (Olugboyega, 2019), limitations in technical training systems (Ebekozi et al., 2024), increased emphasis on local content and sustainable construction (Nwosu et al., 2006), and the growing use of prefabrication technologies (Adindu et al., 2020).

Integrating these contextual factors with VUCA theory enables the identification of dimension-specific effects, such as whether volatility and uncertainty require more adaptive staffing models, or whether complexity and ambiguity necessitate systemic workforce restructuring and improved decision-making capabilities. As Nigeria invests in ICT-driven construction processes and workforce development, understanding the influence of VUCA literacy on manpower efficiency is critical for enhancing project outcomes, including cost control, quality assurance, and timely delivery. This study addresses the knowledge gap by generating contextually grounded insights to inform policy, educational curriculum development, and organizational human-resource practices aimed at fostering VUCA-ready manpower systems in Nigeria's construction industry. The findings are also relevant to other developing economies facing similar challenges (Kilanko & Oladiran, 2023; Obeagu, 2020). The study specifically aims to assess the level of VUCA (volatility, uncertainty, complexity, and ambiguity) awareness among construction professionals in Nigeria and examine how this awareness influences manpower operations in building construction firms, to develop context-specific strategies to improve workforce planning, deployment, and capability development for enhanced project performance.

2.0 LITERATURE REVIEW

2.1 Presence of VUCA in the Building Construction Industry

The world is dynamic and changing at a fast pace, which, according to Schoemaker et al. (2018), today's businesses operation has become not only riskier, but also more volatile, uncertain, complex, and ambiguous (VUCA). Similarly, the companies and leaders have been operating in a highly unstable environment, and the consequences may be adverse (Mitika & Farhat, 2020). Organisations,



including the construction industry, are trying to be proactive in this constantly changing and unpredictable world. In their study, Doheny et al. (2012) have highlighted several factors that have been impacting organisations across the globe, viz.: incremental globalisation, interconnected operations, and disruptive trends such as fluctuating demand, labour rates, or commodity prices, and other factors such as natural calamities. All these obstacles and roadblocks have been rising in recent years, making

market conditions even more challenging. The desire for the welfare of future generations is important (Shen et al., 2011). Studies show a broad consensus that the whole world is experiencing Volatility, Uncertainty, Complexity, and Ambiguity. It therefore becomes important for leaders/construction professionals and organisations worldwide to think out of the box to stay abreast of the current scenario (Bennett & Lemoine, 2014).

Table 1: A general VUCA framework for projects.

Dimensions	What is it?	Example	How to address it
Volatility	Changes are frequent and unpredictable	Prices, stocks, politics, economy	Adopt change management and agile methods
Uncertainty	The impact of future events is not known	Climate change's impact on infrastructure	Information analysis bypassing cognitive biases
Complexity	Many interconnections and levels	Many subcontractors, connected tasks	Decomposing the project, rolling planning
Ambiguity	Lack of knowledge, unclear what to expect	Fake news, social media	Integrity, communication, psychology

Source: Bennett and Lemoine (2014)

2.2 Manpower Operations in the Building Construction Industry

Manpower (workforce) is the total supply of personnel available or engaged for a specific job or task (Alfa, 2015). Manpower operations affect construction activities, which in turn affect nearly every aspect of the economy, and the industry is vital to the continued growth of the economy (Olawore, 2013). The influence of the construction industry on national economic growth requires improvement of productivity by means of cost, time, and quality effectiveness that is expected to contribute immensely to the economics of the nation (Aibinu & Jagboro, 2007). The construction industry in Nigeria is like any other construction industry in the world in terms of economic growth and also in the problems facing it (Ali, 2016). Danso and Menu (2013) justify that Nigeria is like most developing countries, where the construction industry plays a dominant role in the economic activities of the country. Despite the Government’s apparent concern over the quality of skilled workers’ performance outputs in

Nigeria, little effort has been made to ensure compliance to efficient productivity in the Nigerian construction industry and this is reflected in the publication of only two codes of practice for use in the construction industry in 1973 by the Standard Organisation of Nigeria (SON) since its inception (Ahaotu & Pathirage, 2015). These codes are outdated in relation to the present development in construction materials, design, and site techniques (Adenuga, 2013).

Looking at the importance of the Nigerian construction industry in the economic development of nations, it becomes necessary to study the manpower activities (operations) of the industry and also to be very vigilant about all the barriers that will affect the output and quality of productivity regarding the manpower (Bilau et al., 2015). In addition, Wogu et al. (2015) reviewed that, Nigeria is pursuing a project tagged ‘vision 2020’ as one of its strategies to become one of the top leading twenty (20) economies in the world by 2020. According to Griggs et al. (2016), the structure of labour force in the construction



industry are categorised into skilled and unskilled workers. Ali (2016) posted that, the category of manpower

(workers) operation/activities in the Nigerian construction industry is shown in the figure below.

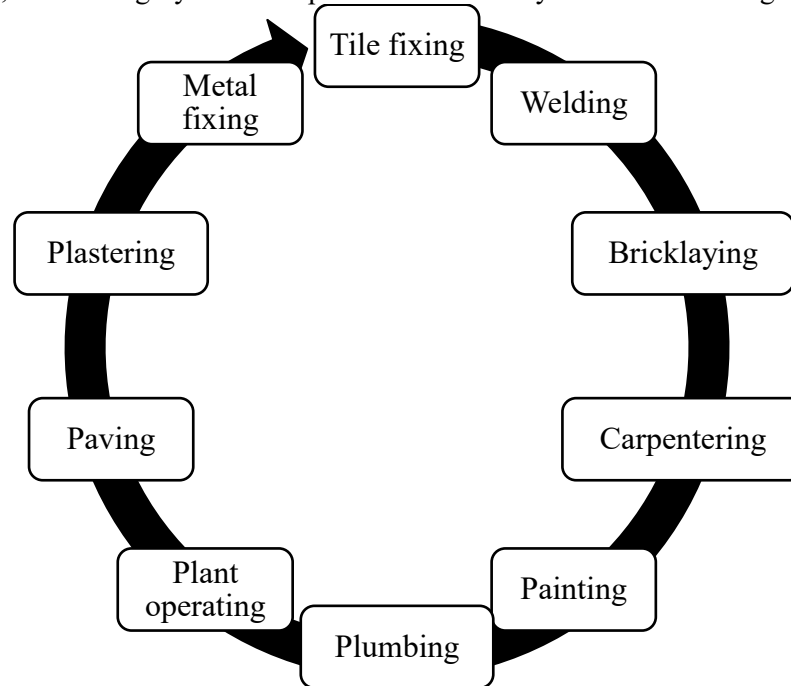


Figure 1: Manpower (workers) operation/activities in the building construction industry

Source: Ali (2016)

Manpower (workforce) is very vital in the process and delivery of building construction projects, despite the significance of building professionals in employing many approaches and models for effective and efficient delivery of building construction projects for customer satisfaction, manpower operations are crucial to the realization of the project's output.

Çiçeklioğlu (2020) posed that, in addition to the leadership (professionals) skill sets, professionals (leaders) in today's VUCA world are expected to manage the following expectations and functions: Mentoring skills to increase

team creativity; Collective thinking skills to achieve results; Agility to increase team speed and focus; Creating design thinking processes to increase team creativity; Storytelling skills to motivate and inspire individuals; To be able to create a Co-productive structure with surrounding individuals; To be able to observe from outside the circle to eliminate business blindness; Ability to diversify resources by taking a proactive approach to meet needs; Development of connection management capabilities to detect inactive points of social networks; and, Ability to create control mechanisms.

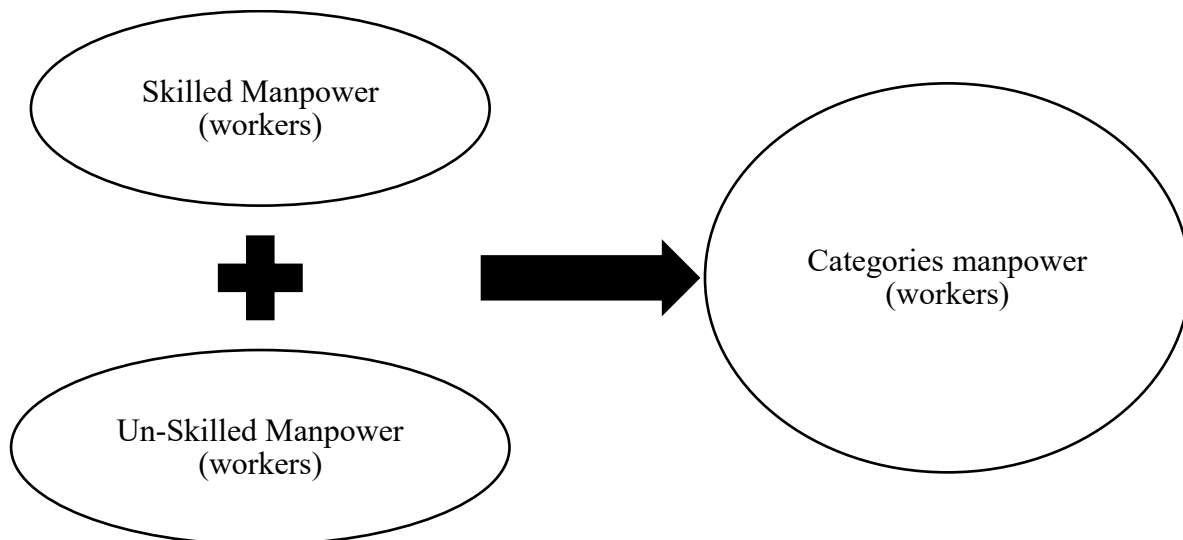


Figure 2: Categories of Manpower (labour force) in the building construction industry
Source: Griggs et al. (2016)

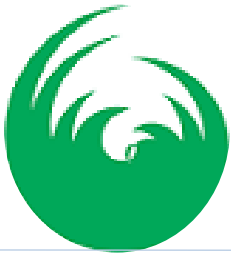
It was reported by Liepmann (2013) that the manpower or workers or labour force under the skilled manpower (workers) are of varying abilities, ranging from apprentices to trades foremen or supervisors. Skilled manpower (worker) is a segment of the workforce with a high skill level that creates significant economic value through the work performed (Bheemaiah & Smith, 2015). Skilled manpower (worker) requires some form of professionalism and training, which does not require a college degree or the like. Uchitelle (2009) reported that common skilled workers include electricians, plumbers, painters, carpenters, carpenters and mason, bar benders, tilers, plant operators, welders, mechanics, and steel fixers.

Also, Ogochukwu (2014) reported that the Industrial Training Fund (ITF) in Nigeria enumerated the following as recognised skilled workers in the construction industry, namely: masons, steel fixers, electricians, carpenters, plumbers, and welders. However, Ali (2016) asserts that skilled manpower (workers) not only work with their hands to build, fix, or install something, but there is also a significant amount of brainpower required to do most jobs. Therefore, skilled workers are persons who have served an apprenticeship, practice the trade learned activity, and by reason of their knowledge and vocational capacity are given tasks which are particularly difficult and need a lot

of experience that involves different trades of specialisation (Vollenhoven, 2016).

The unskilled manpower (workers), on the other hand, is a category of workers that require special skills, and it is defined as any way of making a living with little or no degree of security of income and employment, and they require little or no training to make them perform (Wahab, 2011). Unskilled workers are able-bodied men and women who perform manual duties, and their major asset therefore lies in their strength and healthy body, which requires no special training (Goswami et al., 2016).

The categories of skilled workers include carpenter, bricklayer, painter, iron bender, and plumber (Adewale et al., 2014). Frequently used skilled workers in the construction industry include carpenters, bricklayers, bar benders, plumbers, and painters, where their services are required most in building construction projects (Oseghale et al., 2015). The major categories of skilled manpower (workers) in the building construction industry are: mason, painter, steel fitter, and plasterer (Sherekar & Tatikonda, 2016). By summarizing the various categories of skilled manpower (workers) from the earlier assertions of various researchers, significant similarities can be drawn among the researchers on the different trade specialisations of skilled workers in the building construction industry.



2.3 Awareness of Professionals on the VUCA Model in Building Constructions

Today's building construction professionals (leaders) face problems that have no clear solution, which threaten their own careers and the future of businesses, where it is inevitable that stakeholders will be harmed (Çiçeklioğlu, 2020), and the main reason for this is that the societies and industries in which they operate have unique ambiguities, volatility, complexity, and uncertainties. The perception, identification, and explanation of the VUCA phenomenon led to reformist changes on behalf of organizations (Çiçeklioğlu, 2020). But the success of organizations will not only be gained by understanding and understanding VUCA, but also by being prepared for VUCA and creating strategies that can prevail (Broeckx, 2015). Since most products and services are produced using various project management methodologies, this rise is also giving rise to what can also be called the project-based economy (Hubbard & Rogers, 2019). There is increasing rapid shift like work for most professionals and managers away from routine operational work (i.e., running the business) toward more dynamic project-based work (i.e., changing the business). Not surprisingly, this shift means there in the midst of a growing project-based economy with an estimated 20% growth in project-based roles over the next 10 years (Strategy Execution, 2019); Therefore, project leaders and project management organizations (PMOs) are now playing key roles in this transformation (Hubbard & Bolles, 2015 & 2014). Project leaders will play an important part in embedding the culture of innovation, transformation, and change, and in evangelizing new technologies and methods across the organization (Project Management Institute: PMI, 2018). Project management leadership can drive this transformation by tying people, technology, innovation, and processes into a cohesive whole. As organizations continue to face increased disruption, effective project management practices are more valuable than ever, with leading organizations now elevating the business roles of project professionals and elevating the PMO to address and take advantage of the disruptions within their marketplace.

According to Hubbard and Rogers (2019), Agile Intelligence in Management leading to awareness among professionals on the VUCA model in building is the leadership-agility, also called fluid or flexible intelligence, is a soft-skill capability of operations and project management to quickly change business directions and adjust the scope and modify the market-timing of their enterprise's projects, programs, and portfolios. Flexible intelligence also helps in navigating tough negotiations and embracing challenges on the fly. Professionals (Leaders) with fluid intelligence are adaptive and reflexive. They change their approach to suit the requirements of the environment and situation. In a 2014 White Paper presented by the Centre for Creative Leadership, Adam Mitchinson and Robert Morris sighted by Hubbard and Rogers (2019) suggested that there are five facets of learned agile behavior:

- i. **Innovating:** Agile leaders are not afraid to challenge the status quo,
- ii. **Performing:** Agile leaders remain calm in the face of difficulty,
- iii. **Reflecting:** Agile leaders take time to reflect on their experiences,
- iv. **Risking:** Agile leaders purposefully put themselves in challenging situations, and,
- v. **Defending:** Agile leaders are simply open to learning and resist the temptation to become defensive in the face of adversity.

3.0 RESEARCH METHODS

The research design establishes the foundational framework for planning, implementing, and analyzing data collection processes. Kothari and Gaurav (2014) define research design as a strategic plan that guides how research questions are addressed, while Creswell (2014) emphasizes the importance of selecting both the research subject and the most appropriate methodology. This study employs a quantitative research design to assess the level of awareness among professionals regarding the VUCA model in FCT, Abuja, Nigeria. The literature review informed the development of a structured questionnaire, which was used to rank respondents' opinions on the VUCA dimensions. Numerical data were systematically



analyzed to identify patterns and relationships, with self-administered questionnaires serving as the primary data collection instrument. The accessible population comprised 300 core building professionals involved in construction project management, including architects, builders, civil engineers, and quantity surveyors. Due to the heterogeneous nature of the study population, simple random sampling was not feasible. Therefore, a convenience sampling technique was adopted to access available respondents and reflect the proportional distribution of the population, consistent with the assertion of Sambo (2008). According to Kothari and Gaurav (2014), a research population includes all relevant elements of a study field, while Singh (2006) defines it as the total number of individuals possessing pertinent characteristics. A pilot study was conducted by administering questionnaires to twenty respondents in Abuja to assess the reliability of the research instrument and identify potential weaknesses in the design. Observed flaws and ambiguities in question wording were corrected prior to the final field survey. The results of the first and second pilot studies were correlated to determine the Cronbach alpha (α) value, and pre-tests were conducted before final administration. Data were collected using a structured, closed-ended questionnaire, validated for consistency and reliability in accordance with Kothari and Gaurav (2014). Descriptive statistics, including frequencies and percentages, were used to analyze respondents' demographic characteristics, while mean scores and standard deviations were employed for further analysis. The study achieved an 80% response rate, exceeding the typical 20–30% average in management research (Creswell 2014).

4.0 RESULTS AND DISCUSSION

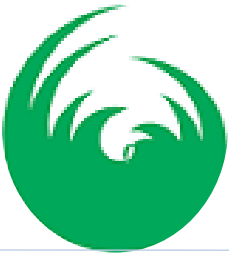
4.1 Assessment of the professionals' level of awareness of the VUCA model in building construction firms for effective manpower operations

Decision:

From: 0.00 – 1.49 = Not Aware (NA), 1.50 – 2.49 = Somewhat Aware (SA), 2.50 – 3.49 = Moderately Aware (MA), 3.50 – 4.49 = Aware (A), and 4.50 – 5.00 = Highly Aware (HA). The table below discloses the level of the professional's awareness of the volatility dimension in building firms for effective manpower operations. The mean scores ranged from 1.6375 to 3.0542, and the standard deviation ranged from 0.99257 to 1.77888. Speed of change in building materials and its instability are identified with a mean score of 3.0542 and a standard deviation of 1.77888. Rapid and violent changes bring about instability on behalf of professionals and organisations, which is identified with a mean score of 2.5875 and standard deviation of 1.38456, as moderately aware by the respondents. Constantly increasing change in building materials and its complication is identified with a mean score of 2.3750 and a standard deviation of 1.37255 as somewhat aware. Where volatility is present, information about conditions and situations of building is obtained, and results of activities can be predicted, is identified as somewhat aware with a mean score of 2.1583 and standard deviation of 1.45502. Strategies can be used against the state of volatility to outstrip technology for building delivery success, which is identified as somewhat aware by the respondents, with a mean score of 1.6375 and a standard deviation of 0.99257. The average mean score value of 2.3625 means that the respondents are **somewhat aware** of the volatility dimension of the VUCA Model.

Professionals' awareness on volatility dimension for effective manpower operations

Volatility awareness for effective manpower operations	X	Std. D	Decision
Speed of change in building materials and their instability.	3.0542	1.77888	Moderately Aware
Rapid and violent changes bring about instability for professionals and organisations.	2.5875	1.38456	Moderately Aware
Constantly increasing change in building materials and their complications.	2.3750	1.37255	Somewhat Aware



Where volatility is present, information about conditions and situations of the building is obtained, and the results of activities can be predicted.	2.1583	1.45502	Somewhat Aware
Strategies can be used against the state of volatility to outstrip technology for building delivery success.	1.6375	.99257	Somewhat Aware
Average Mean Score = $\sum X / 5 = 11.8125 / 5$	2.3625		Somewhat Aware

N = Respondents Population = 240. Std. D = Standard Deviation. X = Mean.

The table below displays the uncertainty dimension for effective manpower operations in the building industry in such a way that Strategies can be used against the state of uncertainty to outstrip perspective to ensure timely building quality project delivery within cost, which is identified with a mean score of 2.8375 and a standard deviation of 1.37622, as moderately aware by the respondents. Building construction businesses are experiencing difficulties, especially with the lack of clear conditions regarding customer preferences, industry, and markets, which is identified as somewhat aware, with a mean score of 2.4042 and a standard deviation of 1.30303. The phenomenon of uncertainty is a lack of knowledge

with vital implications for a specific environment and with unforeseen consequences, which can hinder building project delivery, with a mean score of 2.4000 and standard deviation of 1.01433, and is identified as somewhat aware. Reduction of predictability levels in decision-making phases in building organizations and individuals is expressed as uncertainty, with a mean score of 2.3208 and standard deviation of 1.16844, and is identified and somewhat aware. Level of uncertainty decreases when the desired results are made clear, which can lead to avoidance of conflict, identified with a mean score of 2.1292 and a standard deviation of 1.28557.

The average mean score value of 2.4183 means that the respondents are **somewhat aware** of the uncertainty dimension of the VUCA Model.

Professionals’ awareness on uncertainty dimension for effective manpower operations

Uncertainty dimension for effective manpower operations	X	Std. D	Decision
Strategies can be used against the state of uncertainty to outstrip perspective to ensure timely building quality project delivery within cost.	2.8375	1.37622	Moderately Aware
Building construction businesses are experiencing difficulties, especially with the lack of clear conditions regarding customer preferences, industry, and markets.	2.4042	1.30303	Somewhat Aware
The phenomenon of uncertainty is a lack of knowledge with vital implications for a specific environment and with unforeseen consequences, which can hinder building project delivery.	2.4000	1.01433	Somewhat Aware
Reduction of predictability levels in decision-making phases in building organizations and individuals is expressed as uncertainty.	2.3208	1.16844	Somewhat Aware
The level of uncertainty decreases when the desired results are made clear, which can lead to the avoidance of conflict.	2.1292	1.28557	Somewhat Aware
Average Mean Score = $\sum X / 5 = 12.0917 / 5$	2.4183		Somewhat Aware



N = Respondents Population = 240. Std. D = Standard Deviation. X = Mean.

The table below shows the complexity dimension of the VUCA Model for effective operation. Individuals dealing with any building construction business in various fields can have more than one problem, decision, and solution in their organizations, which is identified as somewhat aware with a mean score of 2.1083 and standard deviation of 1.05335. Design of building often makes its construction complex with changes confounding due to the interconnectedness of processes and information is identified as somewhat aware with a mean score of 1.8167 and standard deviation of 0.95491. Complexity in building is the dense knowledge in today's business world that arises from the external environment and intertwines

without varying effects, with a mean score of 1.6875 and standard deviation of 1.30266. An effective building professional and manager must first bring clarity to events in their own mind in environments with high levels of complexity, with a mean score of 1.5458 and standard deviation of 0.99264, is identified as somewhat aware. Strategies can be used against the state of complexity to simplify every possible item of building construction work, as the most important step to take against building complexity, with a mean score of 1.5167 and standard deviation of 0.95928, is identified as somewhat aware in the dimension. The average mean score value of 1.7350 shows that the respondents are **somewhat aware** of the complexity dimension for the VUCA Model.

Professionals' awareness on complexity dimension for effective manpower operation

Complexity dimension for effective manpower operation	X	Std. D	Decision
Individuals dealing with any building construction business in various fields can have more than one problem, decision, and solution in their organizations.	2.1083	1.05335	Somewhat Aware
The design of a building often makes its construction complex, with changes confounding due to the interconnectedness of processes and information.	1.8167	.95491	Somewhat Aware
Complexity in building is the dense knowledge in today's business world that arises from the external environment and intertwines with varying effects.	1.6875	1.30266	Somewhat Aware
An effective building professional and manager must first bring clarity to events in their own mind in environments with high levels of complexity.	1.5458	.99264	Somewhat Aware
Strategies can be used against the state of complexity to simplify every possible item of building construction work, as the most important step to take against building complexity.	1.5167	.95928	Somewhat Aware
Average Mean Score = $\sum X / 5 = 8.6750 / 5$	1.7350		Somewhat Aware

N = Respondents Population = 240. Std. D = Standard Deviation. X = Mean.

The table below displays the ambiguity dimension for effective manpower operation. Ambiguous changes in building projects' output as regards those that lack precedence, with a mean score of 2.5167 and standard deviation of 1.23399, are identified as somewhat aware.

Ambiguity causes confusion and effect in the building construction industry, which attracts potential for misjudging situations and events, as well as blurring of facts, with a mean score of 2.1292 and standard deviation of 0.71152, and is identified as somewhat aware. Strategies can be used against ambiguity to investigate and uncover the reasons for the issue of building project failures, with a



mean score of 2.0958 and a standard deviation of 1.46478, which is identified as somewhat aware. In the phenomenon of ambiguity, there is only a deficiency in what will happen in the next step of building construction projects, which is identified as somewhat aware with a mean score of 1.6833 and a standard deviation of 1.11650. Ambiguity usually

occurs around a new opportunity, market, or product of building projects, with a mean score of 1.4958 and standard deviation of 0.89161, is identified as not aware in the dimension. The average mean score value of 1.9816 shows that the respondents are **somewhat aware** of the ambiguity dimension for the VUCA Model.

Professionals’ awareness on ambiguity dimension for effective manpower operations

Ambiguity dimension for effective manpower operations	X	Std. D	Decision
Ambiguous changes in building projects out-put as regard to those that lack precedence.	2.5167	1.23399	Somewhat Aware
Ambiguity causes confusion and effects in the building construction industry, which attracts potential for misjudging situations and events, as well as blurring of facts.	2.1292	.71152	Somewhat Aware
Strategies can be used against ambiguity to investigate and uncover the reasons for the issue of building project failures.	2.0958	1.46478	Somewhat Aware
In the phenomenon of ambiguity, there is only a deficiency in what will happen in the next step of building construction projects.	1.6833	1.11650	Somewhat Aware
Ambiguity usually occurs around a new opportunity, market, or product in building projects.	1.4958	.89161	Not Aware
Average Mean Score = $\sum X / 5 = 9.9208 / 5$	1.9816		Somewhat Aware

N = Respondents Population = 240. Std. D = Standard Deviation. X = Mean.

The table below indicates the professionals’ level of awareness of the VUCA Model in building construction firms for effective manpower operations. The respondents are somewhat aware of the volatility dimension, with an average mean score of 2.3625, uncertainty dimension with

an average mean score of 2.4183, complexity dimension with an average mean score of 1.7350, and ambiguity dimension with an average mean score of 1.9816 of the VUCA Model. The average mean score (Avr. X) reveals a value of **2.1244**, which means the respondents are **somewhat aware** of the VUCA Model in the building construction industry.

Professionals’ level of awareness of the VUCA model in building construction firms for effective manpower operations

Dimensions of the VUCA Model for effective manpower operations	Avr. X	Decision
Volatility dimension of the VUCA Model.	2.3625	Somewhat Aware
Uncertainty dimension of the VUCA Model.	2.4183	Somewhat Aware
Complexity dimension for VUCA Model.	1.7350	Somewhat Aware
Ambiguity dimension for VUCA Model.	1.9816	Somewhat Aware
Average Mean Score = $\sum \text{Avr. X} / 4 = 8.4974 / 4$	2.1244	Somewhat Aware

N = Respondents Population = 240. Std. D = Standard Deviation. Avr. X = Average Mean scores.

4.2 Discussion of Findings



This analysis examines the extent to which professionals in building construction firms understand the VUCA framework (volatility, uncertainty, complexity, and ambiguity) and how this awareness influences manpower management. Respondents generally fall within the “Somewhat Aware” (SA) to “Moderately Aware” (MA) categories, with a composite mean of 2.1244, indicating a prevailing tendency toward limited awareness (Kiluange et al., 2024). This result is consistent with broader evidence in VUCA studies, which shows that professional awareness often remains at an intermediate stage until deliberate capacity-building initiatives are implemented (Clegg et al., 2019). Furthermore, it aligns with previous findings that volatility and uncertainty typically receive more attention in practice than complexity and ambiguity (Friðgeirsson et al., 2021; Giones et al., 2019).

Volatility

The moderate level of awareness observed indicates that professionals recognize the frequent, rapid changes affecting project inputs and conditions. This recognition underscores the importance of flexible manpower strategies, including surge capacity and cross-functional training. However, there is an inconsistency in translating this awareness into structured workforce policies. Existing research demonstrates that effective responses to volatility require not only awareness but also institutional mechanisms and decision-support systems that facilitate timely, adaptive staffing (Giones et al., 2019; Biloslavo et al., 2024).

Uncertainty

Respondents demonstrate an understanding that uncertainty arises from unpredictable market dynamics and unclear client requirements. This finding aligns with VUCA theory, which links uncertainty to incomplete information and limited predictive capability (Kiluange et al., 2024; Clegg et al., 2019). Despite moderate awareness, there is a clear need to strengthen approaches such as scenario planning and flexible workforce arrangements. Enhancing adaptive decision-making structures would further support manpower management under uncertain conditions (Biloslavo et al., 2024).

Complexity

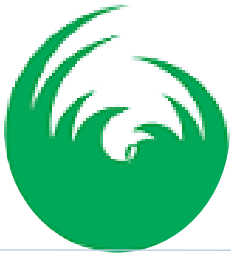
Awareness of complexity is comparatively low, suggesting that although professionals acknowledge interdependencies and technical challenges, they struggle to translate this understanding into practical workforce strategies. This pattern is consistent with existing research, which indicates that complexity is often recognized but not effectively operationalized in construction workforce planning (Giones et al., 2019; Sowden, 2025). Addressing this gap requires deliberate structuring of roles, workflows, and cross-functional coordination mechanisms to better manage intricate project environments.

Ambiguity

Findings regarding ambiguity are mixed. Some respondents demonstrate awareness, particularly in identifying emerging opportunities, while at least one indicator reflects a lack of awareness, indicating uneven understanding across the sample. The literature on VUCA emphasizes that ambiguity requires experimentation, iterative learning, and flexible staffing models (Giones et al., 2019). The low awareness among certain professionals highlights the need to improve tolerance for unclear and evolving situations.

Cross-Dimensional Insights and Implications for Manpower Operations

The balanced awareness of VUCA across its dimensions underscores the need for structured capacity-building. Training initiatives should emphasize scenario planning, decision-making under uncertainty, systems thinking for managing complexity, and adaptive responses to ambiguity. Skills such as contextual intelligence and adaptive leadership are essential for addressing VUCA challenges in construction (Evans & Trąpczyński, 2023; Sowden, 2025). In addition to training, VUCA considerations should be integrated into organizational governance and decision-support systems, including embedding VUCA diagnostics into risk assessments, adopting flexible staffing models, and applying decision frameworks such as Cynefin to tailor responses to specific issues (Friðgeirsson et al., 2021; Biloslavo et al., 2024).



Construction firms should align manpower strategies with VUCA realities by combining agile human resources practices, leadership development, and proactive workforce planning. Emerging insights from artificial intelligence and contextual intelligence can further enhance decision-making and organizational resilience (Clegg et al., 2019; Evans & Trąpczyński, 2023; Alfiandri et al., 2024). Currently, professionals in building construction demonstrate a moderate understanding of VUCA, with greater focus on volatility and uncertainty than on complexity and ambiguity. This pattern reflects exposure to external dynamics but also reveals a gap in translating awareness into actionable workforce strategies. Improving manpower operations requires a comprehensive approach that incorporates targeted training, robust governance, and advanced decision-support tools.

5.0 CONCLUSION AND RECOMMENDATIONS

The assessment demonstrates that professionals in building construction firms generally possess a moderate level of awareness of the VUCA framework, with greater familiarity with volatility and uncertainty than with complexity and ambiguity. Although practitioners encounter dynamic and unpredictable project environments, their understanding of VUCA remains primarily perceptual rather than operational. The results indicate a gap between awareness and practical application, particularly in translating VUCA concepts into structured manpower strategies. As a result, manpower operations in construction firms may not be fully prepared to respond proactively to rapidly changing conditions, interdependencies, and ambiguous scenarios. Addressing this gap requires intentional efforts to strengthen both individual competencies and organizational systems, thereby transforming VUCA awareness into actionable and adaptive workforce management practices.

To strengthen manpower operations under VUCA conditions, construction firms are advised to implement targeted training in scenario-based planning, systems thinking, and decision-making under uncertainty. Developing adaptive leadership is essential for managing volatile and complex environments effectively. Organizations should integrate VUCA considerations into

governance frameworks and adopt flexible manpower strategies, including cross-training and modular staffing. Enhancing coordination, clarifying roles, and fostering collaboration will address complexity. Furthermore, promoting continuous learning and utilizing digital decision-support tools can improve organizational responsiveness. Establishing proactive workforce policies will ensure that manpower planning aligns with the dynamic and unpredictable nature of construction project environments.

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