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EVOLVING *HANGWURAN* CITY DEVELOPMENT MODEL THROUGH PARTIAL LEAST SQUARE APPROACH IN NORTH-CENTRAL NIGERIA

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ABSTRACT

The need for a paradigmatic shift in city development ideology has become increasingly evident over the years. In response to this need, the Hangwurian City Development Model was developed to establish a connection between the concepts of environmental awareness, urban governance, and management. This model also integrates sustainable urban development, urban liveability, and inclusive physical development. The research sets a critical objective of analyzing the significant levels of various indicator variables. The exploratory research utilized partial least squares (PLS) via SmartPLS to evaluate the variables, collecting quantitative data through the open data toolkit from three selected cities: Lokoja, Minna, and Lafia in North-Central Nigeria. The study sampled 843 respondents across the cities, randomly selected among residents aged 18 years and older, with a focus on household heads as the unit of measurement. The research findings indicate that most of the examined variables have Cronbach's Alpha above 0.7, and most of the retained variables have a significance value greater than or equal to 0.7. The average variance explained by the indicators was very substantial, with most falling within the 0.5 to 0.6 range. Therefore, the research recommends that, due to the significance of the indicators and the validity of the internal and external data, this model can be applied as a procedural framework to guide city development on a regional scale. Consequently, it was concluded that for city development to progress and evolve without the issues that Hangwurian city development aims to address, it must be approached through the interconnectedness and significance of environment, governance, sustainability, liveability, and inclusion.

Keywords: Environmental awareness; Hangwurian city development; Urban liveability; Inclusivity; Sustainability; Urban management and governance

1. INTRODUCTION

The development of urban spaces, especially in developing countries, has been characterized more by organic emergence than by the result of a defined planning style (Boonstra & Boelens, 2011). This type of urban development is also associated with uncoordinated and unplanned population expansion within cities (Dankani & Abubakar, 2016). The rate of this population growth continues to drive the demand for space for housing and other urban functions (Harvey, 2008). Several efforts have been implemented to manage the rapid urbanization of these cities and provide guidance for steadier urban growth (McCormick et al., 2013). Among these efforts to manage urban growth and development is the evolution of various urban development concepts, which include sustainability, liveability, inclusivity, environmental awareness, and inclusive development.

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Sustainable urban development, urban liveability, environmental awareness, inclusiveness, and urban governance all stem from the aspiration for a better urban environment. The detrimental effects of current lifestyles on the environment necessitate a more thorough study of human environmental behavior and social interactions (Correa Rodrigo, 2001; Mabee, 2004; Olsson et al., 2004; Sosa et al., 2008). Consequently, economic and social development strategies must incorporate environmental quality and sensitization monitoring within their objectives (Alcalá et al., 2006). Furthermore, the literature suggests that public programs and policies should foster participation in understanding the perspectives of community inhabitants regarding their knowledge, thoughts, and feelings about their environment (Starr et al., 2000).

Securing the participation of all community members is crucial for enhancing their quality of life and addressing environmental concerns both individually and collectively (Kos et al., 2003). The strategic application of governmental powers and policy objectives is essential to raise ecological awareness within the community (Sachs et al., 2019). A fundamental aspect of governance is its redefinition, moving away from historical connotations (Kjaer, 2023). Good governance is now perceived as a regulatory system that orchestrates the interactions between citizens and the state, grounded on principles that are widely recognized as vital to effective government (Howlett, 2019).

In the pursuit of "excellent governance," it is imperative to enhance "practically every aspect" of the public sector (Grindle, 2004). In recent years, many policymakers have focused on the socio-financial elements of governance reform, emphasizing the connection between these facets of governance and overall transformation (Hout, 2009). Hout and Robinson (2009) highlight a shift in governance ideology, moving away from merely "good governance" to the practical implications of governance. This shift involves an evolving understanding of the impact that power, politics, and behavioral tensions have when conceptualizing development outcomes and the strategies for mitigating these challenges within institutional and governance programs.

During the transition phase, a systematic assessment of environmental consciousness and urban governance is evident (Topal et al., 2020). This assessment serves as a crucible for urban growth, enhancing the city's sustainability, liveability, and inclusiveness (Krishnamurthy, 2019). Sustainable Development (SD) was established at the 1992 United Nations Conference on Environment and Development (UNCED), with Agenda 21 set as a universal goal for humanity (Mensah, 2019). Since then, SD has gained traction as a political ideal and goal at all levels, from international to national to local (Mair, 2012). The philosophy of sustainable development can be traced back to the 1960s when the links between economic growth, pollution, and environmental degradation were first recognized (Mensah, 2019; Mebratu, 1998).

Sustainable development (SD) not only promotes economic growth but also emphasizes the need to reconcile this growth with environmental protection (Ghisellini, Cialani & Ulgiati, 2016). SD challenges can be categorized broadly into two areas: improvement (to enhance conditions) and long-term viability (to maintain them) (Baumgartner & Ebner, 2010; Haberl et al., 2011). SD seeks a balance among environmental, economic, and lifestyle considerations (Goodland and Daly, 1996), typically analyzed in terms of these three dimensions.

The hallmarks of sustainable development include optimal quality of life and the preservation of the environment in its broadest biophysical and socioeconomic contexts (Quental et al., 2011). The future should hold no disadvantages. Environmental concerns, economic growth, and human reform are interwoven within a sustainable development framework that spans the globe and the decades (Imran, Alam, & Beaumont, 2014). Meanwhile, the European Commission (2002) focuses on the social and environmental aspects of development in politics, practice, and academia. In-depth analyses of sustainable development underscore urban liveability and inclusion as essential components of these efforts. The concept of liveability is an integral part of planning (Balsas, 2004; Medayese et al., 2021a). Governments at all levels increasingly use the term “liveability” to articulate long-term objectives (Lowe et al., 2015). The ideal of “liveability” has been woven into a myriad of planning sub-disciplines, including transportation, community development, and resilience (Dianat et al., 2021; Medayese et al., 2021b). While the term “liveability” is frequently employed in planning documents, it is subject to a plethora of interpretations. Various definitions have been proposed, each highlighting distinct themes and characteristics (Istrate & Chen, 2022). However, most discussions of “liveability” eschew a definitive description, focusing instead on the application of key definitions. An understanding of what planners and communities mean by “liveability” can be gleaned from examining its usage.

Liveability can be summarized as an urban system that nurtures the physical, social, and mental well-being, as well as the personal development, of all its residents. It encompasses the creation of aesthetically pleasing urban spaces that act as conduits for the dissemination of religious and cultural values (Audretsch, Belitski & Korosteleva, 2021). Foundational concepts of this theme include equity, decency, accessibility, friendliness, engagement, and empowerment (Saxena, 2021). Cities that are friendly to people have always considered those social groups whose vision of a liveable city includes the preservation or restoration of these aspects (Routman, 2018). The liveability of a city is assessed based on three factors: Quality of Life, Liveable Communities, and Place Shaping (Lowe et al., 2015). Although the term “social misfits” was first introduced by Aalbers (2010) to describe a particular class of individuals, these individuals were labeled as “social misfits” due to a range of characteristics, including, but not limited to, “mentally and physically disabled, suicidal people, elderly invalids and abused children,” as well as drug addicts, delinquents, single parents, households with multiple problems, marginalized and asocial individuals, among others (Lowe et al., 2015).

In response to the growing concern about social exclusion, efforts to promote social inclusion have emerged (Khan, Combaz & McAslan, 2015). Inclusion enhances the lifestyles of those marginalized by empowering individuals regardless of their age, gender, disability, color, ethnicity, religion, or economic position, providing them with more opportunities, access to resources, and a voice (Kapilashrami & Marsden, 2018). Thus, inclusion serves as both a means and an end (Dudley-Marling & Burns, 2014). To achieve social inclusion, it is necessary to remove barriers to community involvement and implement proactive inclusionary measures (Simplican et al., 2015). It is a political solution to the problem of exclusion, aiming to include and accept everyone while also promoting greater equality and tolerance (Kymlicka, 2010).

Beginning in the mid-1990s, a renewed interest in the state’s role in development marked a significant departure from the neoliberal paradigm that had predominated for decades (Zadra, 2017). This approach, embodied in the Washington Consensus, reflected deep doubts about the state’s ability to play a crucial role in development (Batley, 2002). However, it became clear that structural adjustment programs in developing nations, which supported the downsizing of the state, were not effective. Policymakers also recognized that the ‘tigers’ of East Asia had prospered due to the state’s active encouragement of markets through industrial and financial policies. Decades later, Hout and Robison (1990) identified the first phase of donor governance strategy, focusing on improving government effectiveness and creating a legislative foundation for market-based development in the early half of the decade (Hout and Robison, 2009).

2. LITERATURE STUDY

2.1 The Historical Context of the Hangwurian Model

The Hangwurian development model is based on the SARChI Chair for Inclusive Cities' school of thought at UKZN. This ideological perspective emerged from the research chairperson, Hangwelani Magidimisha, and her doctoral researcher, Samuel Medayese (Medayese et al., 2021). The scientific collaboration between Professor Magidimisha (supervisor) and Dr. Medayese (mentee) is founded on the city model mentorship (Popoola, 2022). Popoola (2022) has discussed the significant role of mentors in establishing scientific identity and fostering a scientific school of thought.

The Hangwurian model seeks an ideal urban space that sustainably utilizes the environment through effective urban governance, ensuring that no elements of the city space are excluded during the development and promotion of liveability (Kasim et al., 2020; Lowe et al., 2015). The model's purpose is to facilitate city modifications that adhere to the principles of accessibility, equity, and moderated consumption patterns, guiding urban development and growth. It employs indicator variables such as environmental awareness, urban management and governance, sustainable urban development, urban liveability, and inclusive physical development to ensure that urban development avoids the spatial divides and deprivations commonly observed in African city spaces. This new paradigm in urban development recognizes the unique variations and strengths of a particular environment to promote its distinctive development. The term "Hangwurian" is derived from "Hangwelani," a Venda word meaning 'no worries' or 'hopeful.' The fundamental idea is to ensure that urban development is conceptualized in alignment with the strengths, weaknesses, opportunities, and threats inherent in the environment under development focus.

A pragmatic approach to city planning involves considering each site's unique characteristics to foster growth that is tailored to that specific locale. The term "Hangwurian" originates from "Hangwelani," a South African Venda word meaning "no worries" or "hopeful." The essence of this approach is to ensure that the SWOT analysis of the area in question is incorporated into the urban planning process.

The Hangwurian model, as a collaborative and descriptive urban analysis framework, draws on the strengths of several research works by Hangwelani Hope Magidimisha. For instance, Magidimisha and Chipungu (2023) highlighted the importance of inclusivity and the need to move away from xenophobic exclusionary tendencies, advocating for the inclusion of vulnerable groups. Her works and publications cover a range of issues related to inclusivity and urban development. The concept of a 'Hangwurian city' as a participatory urban space was emphasized in Medayese, Magidimisha, and Chipungu (2022). Additionally, Medayese and Magidimisha (2022) evaluated the Spatial Matrices of Urban Expansion in Lafia, North-Central Nigeria, serving as a pioneering work arguing for a development paradigm unique to the African city system, free from the biases of foreign ideals that characterize most existing urban development frameworks. Medayese and Magidimisha (2021) also acknowledged the challenges of urban liveability and the shortcomings of urban development in the African city context, while Medayese, Magidimisha, and Chipungu (2021) contended that the desired quality of life could act as a moderator in the relationship between liveable communities and place-shaping. The collective outcomes of these studies provided the impetus for a new approach in urban development modeling, with the partial least squares method offering a way to evolve an urban development model that aligns with the challenges and peculiarities of the African city system.

2.2 Conceptual Framework

Sustainable urban development, urban liveability, environmental awareness, inclusiveness, and urban governance are all outcomes of the aspiration for a better urban environment. A closer examination of human environmental behavior and social relationships is imperative due to the detrimental impacts of current lifestyles on the environment (Corrêa et al., 2006; Mabee, 2004; Olsson et al., 2004; Sosa et al., 2008). Economic and social development strategies must integrate environmental considerations, necessitating the monitoring of environmental quality and public awareness of environmental issues. The literature also suggests that public programs and policies promoting engagement require an understanding of the community's knowledge, thoughts, and feelings about their environment (Hart, 2013).

Community members' attitudes and values regarding their quality of life and solutions to environmental issues must be solicited (Kos et al., 2003). Enhancing the public's understanding of environmental concerns requires the successful application of political will and policy objectives. Redefining governance in the modern era is a crucial aspect of governance. Governmental systems are designed to regulate the interactions between the state and society, based on principles recognized as mutually interdependent. Governance is an expansive and inclusive term, and the pursuit of "good governance" depends on improvements across nearly all facets of the public sector (Grindle, 2004).

For many policymakers, the political-economic aspects of governance reform have been a priority since the dawn of the 21st century (Hout, 2009). Hout and Robison (2009) observed a growing recognition of the influence of power, politics, and social conflict on development outcomes and the challenges these present to existing institutional or governance programs. During the transition period, a heightened awareness of environmental consciousness and urban governance may be discerned. As it lies at the heart of urban growth, this focus helps ensure that the city's development is environmentally friendly, liveable, and inclusive for all residents. This approach was encapsulated in Agenda 21 at the United Nations Conference on Environment and Development (US Coordination Centre for the UN Conference on Environment and Development, 1992). The concept of sustainable development, established in 1992, was adopted as a political goal worldwide. To understand the origins of sustainable development, one must look back to the environmental movement of the 1960s and the recognized link between economic growth and environmental degradation.

Sustainable development centers on the human condition, distinguishing itself from other development forms by emphasizing economic growth while underscoring the need to balance such growth with environmental protection. Sustainable development is universally acknowledged to have two dimensions: development (improvement) and sustainability (maintenance). In planning and decision-making for sustainable development, it is essential to consider economic development, environmental protection, and social justice (Goodland & Daly, 1996). These three aspects are considered the pillars of sustainable development. When implemented effectively, sustainable development enhances well-being, protects the environment and resources in the broadest biophysical and socioeconomic sense, and ensures that future generations do not suffer from present decisions. Sustainable development must integrate environmental concerns with economic development over time and space. It also highlights the social and ecological dimensions in politics, practice, and research. In examining sustainable development in detail, the quality of the urban environment and social inclusion are crucial elements.

Liveability has become a cornerstone of the planning process, with governments at all levels using the term to articulate their long-term objectives. Beyond transportation, liveability is embraced across a spectrum of planning sub-disciplines and is a key consideration in industries related to subjective well-being and quality-of-life research. While "liveability" is a common term in planning documents, it encompasses a diverse range of meanings, leading to a rich tapestry of topics and characteristics. However, its technical definition often remains elusive, with its practical meaning derived from common usage. Understanding how liveability is applied offers planners and communities valuable insights into their collective vision of a liveable city.

Liveability can be summarized as an urban framework that nurtures the physical, social, and emotional well-being, as well as the personal development, of its inhabitants. It involves crafting aesthetically pleasing urban spaces that facilitate the dissemination of religious and cultural values. Foundational principles such as equality, decency, accessibility, friendliness, participation, and empowerment guide this concept. Cities that are attuned to the needs of people include social groups whose vision of a liveable city is one where these principles are maintained or reinstated. The evaluation of a city's liveability can be based on three criteria: place shaping, quality of life, and liveable communities. The terms "inclusion" and "exclusion," coined by René Lenoir in 1974, describe the challenges faced by various demographics, including those with disabilities, the elderly, abused children, addicts, and other marginalized individuals, highlighting the need for inclusive urban development (Banerjee, 2016).

Efforts to promote social inclusion have been a response to the growing concerns about social exclusion. Social inclusion aims to empower those disadvantaged by age, gender, disability, race, ethnicity, origin, religion, or socioeconomic status by providing more opportunities, access to resources, and a voice in society. Achieving social inclusion involves removing barriers to societal participation and actively implementing inclusive measures. It is a deliberate process that seeks to promote social equality and embrace all individuals.

Since the mid-1990s, there has been a renewed interest in the state's role in development, marking a departure from the neoliberal paradigm that had dominated previously. This shift was met with skepticism regarding the state's capacity to significantly influence development (Batley et al., 2002). Policymakers recognized that the rapid growth of the East Asian "tigers" was a result of the state's proactive industrial and financial policies. According to Hout and Robison (1990), donor governance policy, which began in the early 2000s, focused on improving government efficiency and necessitated technocratic reforms to support market-based development (Hout & Robison, 2009).

To evaluate the ideological relationship between ecological consciousness and urban governance, we employ environmental knowledge and environmental motivation/values as indicators of environmental awareness. There are numerous indicators of urban governance, such as population management, family planning, credit facilities, and information flow. When these indicators are integrated, they can help balance the development flow between sustainable urban development—measured by economic prosperity, social cohesion, and environmental consideration—and urban liveability, which is measured by the quality of life for residents and the creation of livable communities. A careful examination of the complex interaction between these concepts has shown that the ability to create a sustainable consumption pattern for both human and natural resources, improve access to the city, and ensure equity within it, is key to a paradigm shift toward new urban thinking. This shift can lead to a city free of worries and concerns. The Hangwurian Model has been suggested for physical and urban development, and Figure 1 depicts the path connectivity of this proposed concept.

According to environmental knowledge and motivation/values, the ideological connection between environmentalism and urban governance is measured. In contrast, indicators of urban management such as population control, family planning, credit availability, and information flow, among others, can be used to balance the development tides between the three pillars of sustainable urban development: economic prosperity, social cohesion, and environmental consideration. Critical analysis has therefore established, through a careful appraisal of the depth of relationships and tension within these concepts, that the ability to develop an acceptable consumption pattern of both human and natural resources, enhance access to the city, and ensure equity within the city holds the ace for a paradigmatic shift to new urban thinking. This can deliver a city without worries. Figure 1 examines the path connectivity diagram of the Hangwurian Model proposed for physical and urban development.

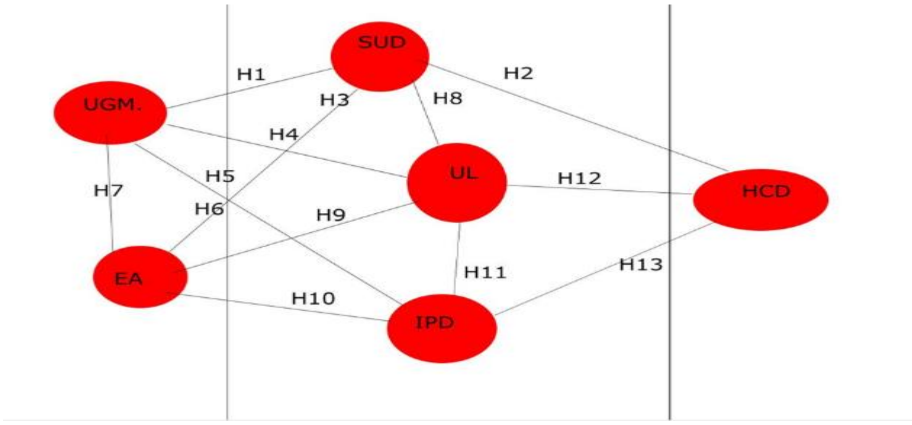

Figure 1 *Hangwurian* City Development Path Diagram
(Source: Author's Simulation)

Consumption patterns, access to the city, and equity constitute the three foundational pillars of the Hangwurian City concept—an Anglicized version of the Xhosa word "Hangwelani." By leveraging policymakers and urban gatekeepers as catalysts, this paradigm shift in development focus aims to transform African cities into spaces that exude value and competitiveness. It seeks to resolve conflicts within the African city system by fostering development at a pace commensurate with available resources and enhancing the acceptability of development initiatives. The Hangwurian City Development (HCD) paradigm in North-Central Nigeria is the focal point of this research. The primary objectives are to determine the predictive significance of various indicators, analyze the significance levels of the indicator variables, and ascertain the importance-performance index of the evolved variables of HCD.

3. METHODOLOGY

The development of a model hinges on a critical element: empirical testing of theories and notions by scholars in fields such as Planning. The incorporation of Structural Equation Modeling (SEM) as a causal simulation model has broadened its application, as noted by Fernandes (2012), Hulland (1999), and Hair et al. (2012). SEM integrates first-generation methods like principal components and linear regression analysis, connecting them in a comprehensive framework (Fornell, 1982). Researchers increasingly investigate complex hypotheses, concepts, and models to estimate composite relationships between variables (Chin, 2010; Robins, 2012).

A range of SEM-based techniques for modeling data includes covariance-based SEM (CB-SEM) and variance-based Partial Least Squares SEM (PLS-SEM) (Hair et al., 2012; Hair et al., 2013). CB-SEM is a confirmatory technique that estimates correlations between variables based on theoretical parameters, ensuring the model's proposed covariance matrix aligns more closely with the sample covariance matrix (Hair et al., 2012). In contrast, PLS-SEM adopts a predictive strategy, focusing on the model's endogenous target constructs, such as the (R2 value), to extend explained variance (Hair et al., 2012). Statistical approaches like regressions and structural equation modeling have been employed to validate models concerning sustainability and livability (e.g., Ankrah, 2007; Isik et al., 2010). PLS-SEM, a multidimensional technique, can evaluate multiple outcomes and predictors, whether continuous or categorical.

PLS-SEM operates under flexible normality assumptions about distribution and is prediction-oriented with a variance foundation, enabling maximum likelihood-based SEM estimations (Hair et al., 2012). Similar to SEM, it is grounded in Ordinary Least Squares (OLS), which allows for use with smaller sample sizes while still achieving robust statistical prediction power (Nandakumar, 2008; Reinartz et al., 2009). Direct causal paths can be estimated simultaneously through a sequence of path or structural equations, providing an overall evaluation of the model's fit (Goodness of Fit, GoF). Unlike CB-SEM, PLS-SEM has no identification issues, which can severely limit the application of CB-SEM (Hair et al., 2011). SmartPLS (Version 3.0 (M3)) is utilized to analyze PLS-SEM data generated by the SmartPLS software.

As an exogenous or independent variable, the city's citizens significantly influenced the model's evolution. The four endogenous or dependent factors are city demographics, resource availability, environmental knowledge, and urban management strategies. An exogenous variable is one whose variation is explained by factors not included in the model and the variance in other variables. Conversely, an endogenous variable is affected by one or more variables within the model (Lleras, 2005). Reflective indicators were applied to measure the constructs in the study, following the recommendations of Gudergan et al. (2008).

The data sources for this research were obtained from direct field data collection using a structured questionnaire administered in three selected cities in North-Central Nigeria as a test case for the conceptual framework's validation. The questionnaire elicited responses from urban residents in the selected cities, who were asked to rank the identified indicators of the conceptual framework using a 5-point Likert scale. This facilitated the application of partial least squares analysis. The research questionnaire was instrumental in obtaining the empirical and quantitative analysis required to address the research question on the development indicators, which measure the constructs identified in the conceptual framework, as shown in Table 1.

The primary aim of the questionnaire was to simplify the response process for participants, thereby enhancing the overall response rate. Creswell (2003) emphasizes that the correct development of a questionnaire is crucial for gathering accurate data. Easterby-Smith et al.'s (2012) five design principles informed the design of this study's questionnaire. To ensure adherence to these principles, the questionnaire was reviewed by four other researchers specializing in sustainability and liveability. Each question was evaluated using a set of 5-point Likert scales, as outlined by Holt (2014). The survey comprised eight distinct sections.

In the questionnaire design, the constructs employed for the research were derived from a comprehensive review of literature encompassing sustainable development, inclusive development, and urban liveability. These constructs included all the variables present in the conceptual model. Table 1 presents the constructs assessed in the questionnaire alongside the research from which the scales were adapted.

An exhaustive literature analysis, including sources outside of the realms of sustainable development, inclusive development, and urban liveability, provided the foundational concepts utilized in the research that informed the questionnaire design. The conceptual model's variables were all part of these constructs. Table 1 illustrates the research that provided the scales and the constructs that were tested in the survey.

Table 1 Constructs for the Study and Sources of the Measurement Items

Constructs	Sub-Constructs	Number of Issues	Origins of the Measurement Indicators
Sustainable Urban Development	Economic Prosperity	5	Rinne et al. (2011); Pizzoli & Gong (2007)
	Social Inclusion	4	
	Demographic Changes	3	
	Public Health	2	
	Climate Change and Energy	2	
	Sustainable Consumption and Production	3	
	Natural Resources	4	
	Sustainable Transport	3	
	Good Urban Governance	3	
	Global Partnerships	3	
Environmental Awareness	Motivation, Values, and Attitudes	4	Mei et al. (2016)
	Environmental Knowledge	4	
	Skills and Abilities	3	
Inclusive Physical Development	Inclusiveness	7	UN-Habitat (2016)
	Safety	8	
	Resilience	4	
	Sustainability	9	
Urban Management (Mgt.) and Governance	Population	2	Flood (1999); Webster (2004)
	Family Planning	2	
	Youth Employment	2	
	Hospital Network Services	2	
	Credit Facilities and Funds for the Development of Rural Areas		
Urban Liveability	Quality of Life	4	Aulia (2016)
	Liveable Communities	7	
	Place Making	5	

Source: Author's Compilation (2021)

The sample frame for this research encompassed the total population of the purposively selected cities, which includes the residents of Lafia in Nasarawa State, Lokoja in Kogi State, and Minna in Niger State. Furthermore, the primary unit of measurement was the households within these cities. The total population of the cities was divided by the average household size to calculate the number of households. Additionally, the research adopted a population projection method to estimate the growth of the study cities' populations from 1991 to 2001, 2002 to 2012, and 2013 to 2019. The population distribution and the sample drawn for the research are detailed in Table 2.

$$P = P_o \left(1 + \frac{r}{100}\right) n$$

where P =projected population; n = years interval; P_o = base year population; r = growth rate.

Table 2 Sample Frame Structure for the Research

S/No	State	City	1991 Census Figures	Projected Population 1991 - 2001	Projected Population 2002 - 2012	Projected Population 2013 - 2019	Total Number of Households = Total Population/5.4
1	Nasarawa	Lafia	240,656	329,756	451,845	563,315	104,318
2	Niger	Minna	230,169	315,387	432,143	538,748	99,768
3	Kogi	Lokoja	82,483	113,018	154,857	193,060	35,752
	Total		**553,308**	**758,161**	**1,038,845**	**1,295,123**	**239,838**

Although the area has a population of 1,295,123, the household serves as the unit of measurement for this research. According to the NPC (2011), the average household size in each city is 5.4 people. Consequently, a total of 239,838 households are considered for the study. The research sample size was determined by accounting for all the households in the city. The appropriate sample size for this study was calculated using an online sample size calculator, with a 35 percent response rate, a 95 percent confidence level, and a confidence interval of 1–5. Therefore, the sample size, which corresponds to the total number of questionnaires distributed for the study across the region, is 843.

This research in achieving the *Hangwurian* City development relied on six (6) essential assumptions:

- Urban governance, administration, and environmental consciousness must be the guiding principles of city growth.
- Environmental knowledge, motivations, and values are used to gauge environmental consciousness.;
- Urban management and governance must be evaluated through the lenses of credit facilities, population control, and hospital network systems.;
- Urban liveability, inclusive physical development, and sustainable development must all be balanced;
- The three concepts are as follows: liveable communities, quality of life, and place-shaping for urban liveability; economic prosperity, environmental considerations, and social cohesion for sustainable urban development; safety, resilience, and equity/justice as metrics for inclusive physical development; and
- It is necessary to gauge the New Order (Hangwurian Model) using metrics related to equity, access to the City, and consumption patterns.

4. DATA ANALYSIS AND RESULTS

To investigate the hypothetical paths proposed in this research (Ringle et al., 2005), we utilized SmartPLS version 3.3 software to perform Partial Least Squares (PLS) analysis and obtain standard regression coefficients for the paths connecting the components, employing the structural equation modeling technique (Croteau and Bergeron, 2001). PLS was chosen for this investigation due to its reliance on the least squares estimation method. This approach allows for identifying latent, formative or reflective variables (Podsakoff et al., 2006). A component-based approach implies that sample sizes and residual distributions are subject to minimal restrictions (Hair et al., 2012; Elbanna et al., 2013).

Moreover, latent variables can be modeled, and structural models can be examined concurrently using PLS-SEM (Elbanna et al., 2013). However, as this study is exploratory in nature, further testing is required. Utilizing this methodology is one of the most widely accepted ways to develop new theories. Additionally, this tool is capable of assessing the impact of common method biases on thought processes (Podsakoff et al., 2003). This strategy has been extensively employed by researchers in marketing and traditional management fields (Elbanna et al., 2013; Hair et al., 2014; Sarstedt et al., 2014).

4.1 Measurement Model

Exploratory factor analysis was employed to ascertain the optimal number of indicators to retain for each of the six latent variables in this study: Hangwurian City Development (HCD), Urban Governance (UMG), Sustainable Urban Development (SUD), Inclusive Physical Development (IPD), Environmental Awareness (E.A.), and Urban Liveability (URL). This process enabled the researchers to pinpoint the most suitable indicator for each construct. The URL construct encompassed twenty-two indicators for urban administration and governance, ten for SUD, sixteen for IPD, eleven for E.A., and fourteen for HCD. In evaluating the measurement model based on the PLS results, it is essential to consider factor loadings, indicator reliability, discriminant validity, convergent validity, and internal consistency reliability.

The exploratory study utilized squared factor loadings, with most indicators approaching (0.7) (Oke and Ogunsemi, 2016; Table 2). However, as indicated in Table 3, they surpassed the exploratory study's minimum requirement of (0.4) (Holland, 1999). The model's component latent reliability ranged from (0.824) to (0.925), exceeding the accepted threshold of (0.70) for internal consistency of individual constructs. The composite elements of the model demonstrated adequate internal consistency and reliability. Convergent validity testing of the model showed that the average variance explained (AVE) was significantly above (0.5), as detailed in Table 3, corroborating the findings of Bagozzi and Yi (1988).

Table 3 Model Path Analysis for *Hangwurian* City Development in North-Central Nigeria

Latent Variable	Indicators	Loadings	Indicator Reliability (i.e., loadings2)	Composite Reliability	R^2	AVE	Cronbach's Alpha
Access to the City	ATC 204	0.743	0.522	0.888	0.911	0.614	0.843
	ATC 208	0.785	0.616				
	ATC 209	0.746	0.557				
	ATC 210	0.825	0.681				
	ATC 211	0.816	0.666				
	ATC 211	0.743	0.552				
Credit Facilities	CRF 141	0.749	0.561	0.849	0.942	0.548	0.766
	CRF 142	0.788	0.621				
	CRF 143	0.830	0.689				
	CRF 144	0.841	0.707				
	CRF 145	0.833	0.694				
Consumption Pattern	CSP 192	0.787	0.619	0.826	0.399	0.614	0.684
	CSP 193	0.819	0.671				
	CSP 196	0.742	0.551				
Economic Prosperity	ECP 3	0.786	0.618	0.882	0.798	0.653	0.822
	ECP 6	0.857	0.734				
	ECP 8	0.731	0.534				
	ECP 9	0.852	0.726				
	ECP 9	0.786	0.617				
Environment	ENV 36	0.850	0.723	0.882	0.725	0.714	0.800
	ENV 39	0.857	0.734				
	ENV 40	0.827	0.684				

Environmental Knowledge	ENVK 169	0.768	0.590	0.914	0.909	0.570	0.892
	ENVK 170	0.750	0.563				
	ENVK 175	0.743	0.552				
	ENVK 182	0.763	0.582				
	ENVK 185	0.784	0.615				
	ENVK 186	0.804	0.646				
	ENVK 187	0.714	0.510				
	ENVK 189	0.713	0.508				
Equity/Justice	EQJ 54	0.763	0.582	0.852	0.453	0.589	0.768
	EQJ 55	0.769	0.591				
	EQJ 56	0.773	0.598				
	EQJ 57	0.766	0.587				
Equity	EQY 213	0.801	0.642	0.864	0.736	0.613	0.791
	EQY 214	0.780	0.609				
	EQY 215	0.789	0.623				
	EQY 216	0.762	0.581				
Hospital Network Services	HNS 151	0.796	0.634	0.891	0..309	0.577	0.803
	HNS 153	0.786	0.618				
	HNS 154	0.797	0.635				
	HNS 155	0.791	0.626				
Liveable-Communities	LVC 102	0.708	0.501	0.871	0.588	0.628	0.762
	LVC 103	0.741	0.549				
	LVC 105	0.770	0.593				
	LVC 106	0.821	0.674				
Motivation and Value	MVA 162	0.807	0.651	0.846	0.903	0.579	0.905
	MVA 163	0.818	0.669				
	MVA 164	0.793	0.629				
	MVA 165	0.830	0.689				
	MVA 166	0.790	0.624				
	MVA 167	0.792	0.627				
	MVA 168	0.753	0.567				
Place Shaping	PLS 112	0.809	0.654	0.925	0.761	0.637	0.756
	PLS 113	0.812	0.659				
	PLS 114	0.835	0.697				
Population	POP 127	0.822	0.676	0.859	0.403	0.671	0.740
	POP 128	0.802	0.643				
	POP 129	0.809	0.654				
Quality of Life	QoL 93	0.837	0.700	0.852	0.625	0.658	0.689
	QoL 96	0.751	0.564				
	QoL 97	0.751	0.564				
Building Resilience	RES 73	0.837	0.701	0.824	0.907	0.609	0.871
	RES 74	0.751	0.564				
	RES 75	0.811	0.658				
	RES 76	0.830	0.689				
	RES 78	0.709	0.503				
	RES 84	0.695	0.483				
Safety	SAF 67	0.756	0.572	0.903	0.739	0.609	0.724
	SAF 69	0.817	0.667				
	SAF 72	0.829	0.687				
Social	SOC 16	0.766	0.587	0.843	0.900	0.642	0.886
	SOC 17	0.816	0.666				
	SOC 18	0.829	0.687				
	SOC 19	0.823	0.677				
	SOC 21	0.771	0.594				
	SOC 22	0.783	0.613				

Source: Author's Analysis (2021)

4.2 Construct Reliability and Validity

Discriminant validity in PLS analysis can be assessed using the criteria outlined in Table 3. Generally, reflective constructs are expected to explain more variance than latent variables, and items should load more heavily on their associated constructs than others (Elbanna et al., 2013). As depicted in Table 3, the loadings for all indicators of latent variables exceed their cross-loadings. The AVEs of the constructs demonstrate greater diversity within their items compared to other constructs. Consequently, a valid and reliable measurement model has been established, which can be utilized to assess the structural model's predictive and explanatory power.

Convergent validity is indicated by multiple items measuring the same construct (Hair et al., 2014). The convergent validity of the measurements in this study was evaluated using external loadings and the average variance extracted (AVE) value. The AVE values should be at least (0.5) if the latent variable explains more than half of the variance in its indicators (Hair et al., 2010). In our analysis, we excluded any loadings below (0.5). The AVE and composite reliability (C.R.) targets were exceeded with ease (refer to Table 3 for details).

In addition, the validity of discriminant, convergent, and composite reliability (C.R.) hypotheses was tested to ascertain the uniqueness of each construct (Hair et al., 2017). According to Fornell and Larcker's criterion (1981), the square root of the average variance extracted (AVE) should be greater than its highest correlation with any other construct. Assessments that adhere to the Fornell and Larcker criteria demonstrate sufficient discriminant validity. However, when the indicator loadings of the constructs are only marginally different, Hair et al. (2016) suggest that this criterion may perform poorly. As an alternative, Henseler, Ringle, and Sarstedt (2015) propose the use of the heterotrait-monotrait (HTMT) ratio.

The HTMT measures the average heterotrait-heteromethod correlation in contrast to the average monotrait-heteromethod correlation. It represents a moderate association between heterotraits and heteromethods, i.e., the mean of all correlations of indicators measuring different constructs. The HTMT statistics and the Fornell-Larcker Criterion data are presented in Tables 4 and 5. The Fornell-Larcker Criterion statistic of (0.845) falls below the minimal threshold of (0.850). However, the HTMT's confidence interval does not include (0) when bootstrapping with a consistent PLS approach, indicating good discriminant validity. Consequently, this research confirms that the model's construct validity is robust.

Table 4 Fornell-Lacker Criterion for Discriminant Validity

	ATC	CRF	CSP	EA	ECP	ENV	ENVK	EQJ	EQY	HCDM	HNS	IPD	LVC	MVA	PLS	POP	QoL	RES	SAF	SOC	SUD	UMG	URL
ATC	**0.784**																						
CRF	0.291	**0.741**																					
CSP	0.617	0.226	**0.783**																				
EA	-0.180	-0.328	-0.163	**0.738**																			
ECP	-0.175	-0.238	-0.089	0.260	**0.808**																		
ENV	-0.136	-0.223	-0.068	0.243	0.665	**0.845**																	
ENVK	-0.177	-0.313	-0.149	0.953	0.265	0.252	**0.755**																
EQJ	0.206	0.259	0.170	-0.157	-0.092	-0.076	-0.151	**0.768**															
EQY	0.730	0.231	0.549	-0.140	-0.122	-0.078	-0.128	0.159	**0.783**														
HCDM	0.954	0.287	0.631	-0.169	-0.167	-0.123	-0.160	0.220	0.858	**0.760**													
HNS	0.199	0.532	0.170	-0.203	-0.114	-0.105	-0.183	0.232	0.145	0.184	**0.793**												
IPD	0.228	0.313	0.161	-0.184	-0.186	-0.156	-0.186	0.673	0.171	0.230	0.313	**0.786**											
LVC	0.195	0.273	0.147	-0.160	-0.093	-0.081	-0.147	0.249	0.159	0.197	0.248	0.214	**0.761**										
MVA	-0.164	-0.310	-0.161	0.950	0.229	0.210	0.812	-0.147	-0.137	-0.161	-0.203	-0.164	-0.157	**0.798**									
PLS	0.173	0.363	0.145	-0.278	-0.183	-0.139	-0.255	0.222	0.128	0.172	0.254	0.236	0.592	-0.274	**0.819**								
POP	0.175	0.621	0.195	-0.282	-0.158	-0.167	-0.267	0.231	0.133	0.165	0.480	0.295	0.270	-0.269	0.324	**0.811**							
QoL	0.187	0.281	0.149	-0.201	-0.165	-0.142	-0.189	0.232	0.136	0.186	0.219	0.221	0.629	-0.193	0.635	0.266	**0.781**						
RES	0.232	0.307	0.146	-0.189	-0.195	-0.156	-0.192	0.661	0.162	0.226	0.299	0.952	0.217	-0.166	0.236	0.300	0.211	**0.781**					
SAF	0.178	0.279	0.143	-0.152	-0.139	-0.113	-0.151	0.641	0.151	0.194	0.274	0.860	0.193	-0.137	0.220	0.231	0.225	0.730	**0.801**				
SOC	-0.120	-0.204	-0.066	0.266	0.763	0.725	0.277	-0.038	-0.093	-0.122	-0.064	-0.115	-0.066	0.228	-0.157	-0.154	-0.143	-0.115	-0.078	**0.798**			
SUD	-0.155	-0.241	-0.081	0.285	0.893	0.851	0.294	-0.070	-0.108	-0.150	-0.099	-0.162	-0.086	0.247	-0.177	-0.175	-0.165	-0.165	-0.116	0.948	**0.738**		
UMG	0.293	0.971	0.228	-0.316	-0.230	-0.211	-0.300	0.267	0.233	0.289	0.556	0.325	0.292	-0.302	0.358	0.634	0.288	0.320	0.288	-0.194	-0.231	**0.799**	
URL	0.211	0.365	0.163	-0.259	-0.195	-0.142	-0.243	0.255	0.158	0.208	0.265	0.250	0.767	-0.249	0.872	0.339	0.791	0.249	0.230	-0.165	-0.186	0.375	**0.763**

Source: Author’s Analysis (2021)

Table 5 Heterotrait-Monotrait Ratio (HTMT) for measuring Discriminant Validity

	ATC	CRF	CSP	EA	ECP	ENV	ENVK	EQJ	EQY	HCDM	HNS	IPD	LVC	MVA	PLS	POP	QoL	RES	SAF	SOC	SUD	UMG	URL
ATC																							
CRF	**0.359**																						
CSP	0.812	**0.314**																					
EA	0.204	0.392	**0.203**																				
ECP	0.209	0.324	0.119	**0.296**																			
ENV	0.167	0.297	0.092	0.280	**0.817**																		
ENVK	0.207	0.386	0.190	1.043	0.309	**0.297**																	
EQJ	0.254	0.331	0.235	0.183	0.115	0.098	**0.179**																
EQY	0.890	0.279	0.740	0.158	0.143	0.097	0.150	**0.197**															
HCDM	1.119	0.345	0.826	0.187	0.194	0.148	0.182	0.270	**1.037**														
HNS	0.241	0.652	0.228	0.228	0.140	0.128	0.211	0.295	0.181	**0.221**													
IPD	0.262	0.379	0.208	0.201	0.213	0.186	0.208	0.820	0.203	0.265	**0.372**												
LVC	0.240	0.338	0.200	0.172	0.115	0.099	0.160	0.321	0.199	0.241	0.312	**0.258**											
MVA	0.190	0.377	0.205	1.027	0.266	0.246	0.899	0.176	0.158	0.182	0.234	0.183	**0.175**										
PLS	0.217	0.470	0.203	0.332	0.229	0.183	0.313	0.292	0.163	0.213	0.324	0.292	0.771	**0.334**									
POP	0.223	0.793	0.274	0.337	0.200	0.217	0.327	0.306	0.172	0.207	0.620	0.366	0.346	0.328	**0.431**								
QoL	0.232	0.372	0.206	0.246	0.205	0.178	0.234	0.308	0.175	0.228	0.289	0.274	0.853	0.245	0.876	**0.364**							
RES	0.266	0.373	0.183	0.203	0.222	0.180	0.211	0.811	0.190	0.256	0.354	1.076	0.265	0.183	0.294	0.371	**0.264**						
SAF	0.224	0.367	0.205	0.188	0.184	0.149	0.190	0.857	0.199	0.247	0.352	1.067	0.257	0.174	0.301	0.314	0.314	**0.907**					
SOC	0.141	0.271	0.094	0.292	0.890	0.861	0.312	0.059	0.108	0.139	0.085	0.134	0.082	0.255	0.192	0.190	0.169	0.135	**0.113**				
SUD	0.176	0.308	0.106	0.306	1.021	0.986	0.323	0.090	0.122	0.166	0.118	0.179	0.101	0.269	0.211	0.209	0.191	0.180	0.150	**1.044**			
UMG	0.338	1.114	0.295	0.344	0.265	0.249	0.333	0.324	0.274	0.331	0.656	0.371	0.342	0.336	0.435	0.784	0.356	0.364	0.359	0.217	**0.251**		
URL	0.264	0.476	0.225	0.305	0.243	0.181	0.293	0.334	0.198	0.256	0.335	0.306	0.974	0.301	1.139	0.450	1.049	0.306	0.311	0.198	0.218	**0.455**	

Source: Author’s Analysis (2021)

4.3 Structural Model Results

It is now appropriate to test the posited hypotheses using the results from the validated structural model. Path coefficients in the PLS model were interpreted analogously to beta values in regression analysis. Mooi and Sarstedt (2011) and Sarstedt et al. (2014) advised testing the model for collinearity issues before estimating path coefficients using ordinary least squares regression. Hair et al. (2014) noted that collinearity in these analyses could indicate bias. Consequently, following Wong (2013) and Sarstedt et al. (2014), we examined the potential linkage between the two constructs. A multiple regression analysis, with latent variable scores serving as predictors, was conducted to determine if collinearity issues within the internal model could be mitigated by constructing independent variables from the external latent variables—specifically, Environmental Awareness (E.A.), Urban Governance (UMG), Sustainable Urban Development (SUD), Urban Liveability (URL), and Inclusive Physical Development (IPD). Conversely, Hangwurian City Development (HCD) was treated as the dependent variable.

Hangwurian Model Path Coefficient

Path coefficients in the PLS model were interpreted in a manner akin to beta values in standard regression analysis. Given that path coefficients are derived using ordinary least squares regression, it was recommended that collinearity be assessed beforehand. Hair et al. (2014) posited that collinearity in these results could suggest bias. Therefore, we examined the potential linkage between constructs in line with Wong (2013) and Sarstedt et al. (2014). The exogenous latent variables—Urban Liveability (URL), Sustainable Urban Development (SUD), Environmental Awareness (E.A.), and Urban Governance (UMG)—were operationalized as independent variables using latent variable scores to investigate collinearity issues within the inner model.

The role of these variables was primarily explanatory. Figure 3 illustrates the relationships between the various exogenous latent factors and their impact on Hangwurian City Development (HCD). Research has associated the growth of Hangwurian City with factors such as environmental consciousness, effective urban administration and governance, high-quality urban living, sustainable urban development, and inclusive physical development (IPD), as well as their collective influence on HCD. Pathways starting from E.A. and leading to HCD and UMG were explored to understand these relationships.

It appears that the hypothesised path of Access to the City (ATC) and Consumption Pattern (CSP) to HCD (Path = 0.63; t = 30.621; p 0.000), as well as the hypothesised path of Equity (EQY) and Path = 0.888 to HCD (Path = 85.662, and p0.000, respectively) to HCD, are both supported. As depicted in Table 6 and Figure 2, these were the hypothesised routes for Hangwurian City Development and its endogenous latent factors. The first three theorised routes for HCD and its endogenous factors have been examined. In addition to the path coefficient, T-statistics, and P-value, the Table also includes other variable analyses between the exogenous and endogenous variables. As a result, the alternative hypothesis supported by the path coefficients for the exogenous latent variables in North Central Nigeria was rejected.

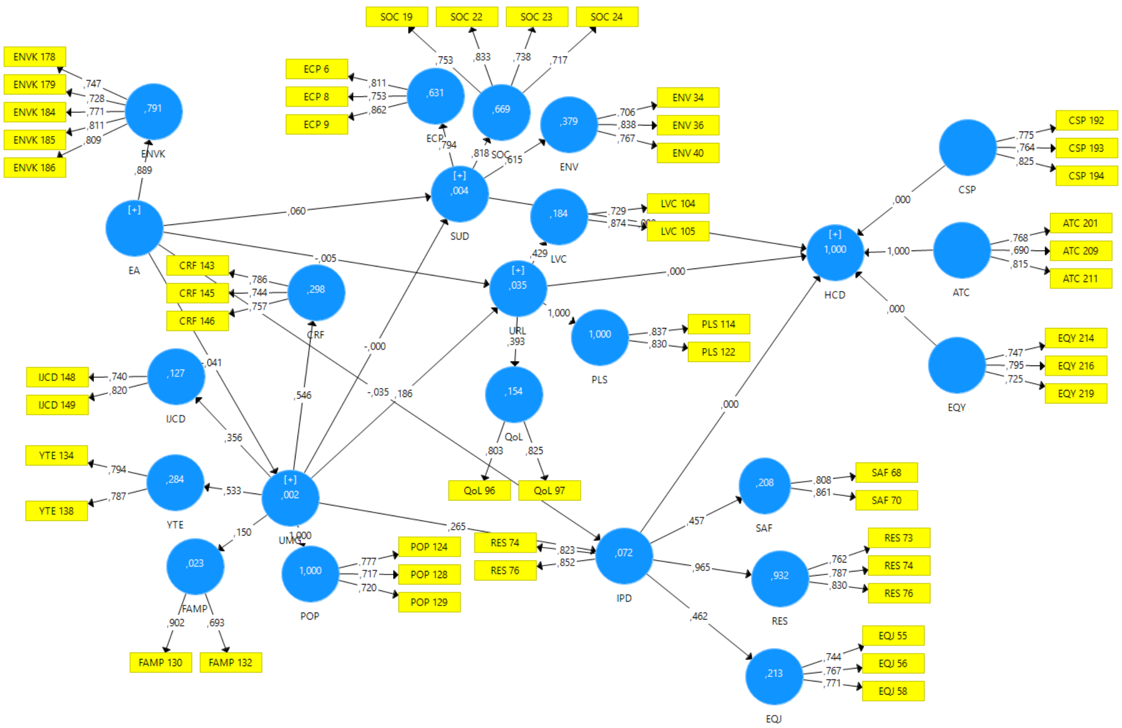

Figure 2 Path Coefficient and Analysis

Table 6 Path Coefficients

Variable Label	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Decision
EA -> ENVK	0.953	0.954	0.004	255.691	0.000	Supported
EA -> HCD	-0.086	-0.086	0.035	2.439	0.015	Supported
EA -> MVA	0.950	0.951	0.004	258.618	0.000	Supported
EA -> UMG	-0.183	-0.183	0.032	5.684	0.000	Supported
HCD -> ATC	0.954	0.955	0.003	299.267	0.000	Supported
HCD -> CSP	0.631	0.634	0.021	30.621	0.000	Supported
HCD -> EQY	0.858	0.858	0.010	85.662	0.000	Supported
IPD -> EA	-0.099	-0.097	0.033	3.002	0.003	Supported
IPD -> EQJ	0.673	0.674	0.020	33.598	0.000	Supported
IPD -> RES	0.952	0.952	0.003	368.881	0.000	Supported
IPD -> SAF	0.860	0.860	0.009	92.828	0.000	Supported
IPD -> UMG	0.212	0.210	0.034	6.237	0.000	Supported
IPD -> URL	0.226	0.224	0.035	6.541	0.000	Supported
SUD -> EA	0.233	0.236	0.036	6.542	0.000	Supported
SUD -> ECP	0.893	0.893	0.008	109.702	0.000	Supported
SUD -> ENV	0.851	0.852	0.013	67.109	0.000	Supported
SUD -> SOC	0.948	0.949	0.004	253.664	0.000	Supported
SUD -> UMG	-0.097	-0.100	0.032	3.026	0.003	Supported
SUD -> URL	-0.149	-0.151	0.034	4.399	0.000	Supported
UMG -> CRF	0.971	0.971	0.002	530.053	0.000	Supported
UMG -> HCD	0.262	0.265	0.035	7.427	0.000	Supported
UMG -> HNS	0.556	0.557	0.027	20.585	0.000	Supported
UMG -> POP	0.634	0.636	0.025	25.612	0.000	Supported
URL -> EA	-0.191	-0.193	0.032	5.917	0.000	Supported
URL -> LVC	0.767	0.769	0.015	52.360	0.000	Supported
URL -> PLS	0.872	0.873	0.008	103.716	0.000	Supported
URL -> QoL	0.791	0.792	0.012	64.851	0.000	Supported
URL -> UMG	0.256	0.256	0.036	7.109	0.000	Supported

Source: Author’s Analysis (2021)

4.4 Discussion

The study examined the validity of factor loadings and indicator reliability, as well as the reliability of internal consistency and convergent validity. The indicators demonstrated values near the acceptable minimum of (0.7) (Oke and Ogunsemi, 2016). Although the significance level for this exploratory study was set at (0), the results were deemed significant as they exceeded (0.4) (Hulland, 1999). The model's component latent reliability ranged from (0.824) to (0.925), surpassing the acceptable threshold of (0.70) for internal consistency of individual constructs. The composite elements of the model exhibited adequate internal consistency and reliability. Furthermore, average variance explained (AVE) values greater than (0.5) were in line with the model's validity, as suggested by Bagozzi and Yi (1988).

PLS analysis assesses discriminant validity using two key criteria. Typically, reflective constructs should explain more variance than latent variables, and items should have stronger loadings on their constructs than others (Elbanna et al., 2013). The indicators' loadings for latent variables are higher than their cross-loadings, indicating that the AVEs of the constructs exhibit a higher degree of variation within their items compared to other constructs. Therefore, the measurement model presented here possesses the necessary validity and reliability to evaluate the structural model's predictive and explanatory power.

Convergent validity refers to items measuring the same construct (Hair, Hult, Ringle, & Sarstedt, 2014). The convergent validity of the measures in this study was assessed using the average variance extracted (AVE) value and external loadings. The AVE values should be at least (0.5) if the latent variable accounts for more than 50% of the variance in its indicators (Hair et al., 2010). Loadings below (0.5) were excluded, resulting in final AVE and composite reliability (C.R.) values exceeding the recommended thresholds of (0.5) and (0.7), respectively.

To determine the uniqueness of a construct, the study examined the validity of convergent, discriminant, and C.R. measures (Hair et al., 2017). Fornell and Larcker (1981) state that a crucial criterion is that the square root of AVE should be greater than the highest correlation with any other construct. Assessments adhering to the Fornell-Larcker criterion demonstrate adequate discriminant validity. However, when the variation in indicator loadings of constructs is minimal, this criterion may not be sufficient (Hair et al., 2016). The Heterotrait-Monotrait (HTMT) ratio proposed by Henseler et al. (2015) is recommended for a more robust assessment. The HTMT measures the average heterotrait-heteromethod correlation, contrasting with the average monotrait-heteromethod correlation, i.e., the mean of all correlations of indicators measuring different constructs. An HTMT statistic below the threshold of (0.850), with none exceeding (0.845), indicates good discriminant validity.

Using a consistent PLS bootstrapping method, HTMT's confidence interval does not contain 0. Consequently, the discriminant validity is excellent. The model's construct validity is adequate, in my opinion. It is now time to evaluate the assumptions that have been posited using the outcomes of the developed structural model, which has proven its reliability and validity. Similar to typical beta values in regression analysis, PLS model path coefficients were used in the same way. Mooi and Sarstedt (2011) and Sarstedt et al. (2014) recommended that the model be verified for collinearity before estimating the coefficients of the paths using ordinary least square regression. Hair et al. (2014) asserted that collinearity in the results of these analyses could indicate bias. Therefore, this study followed Wong (2013) and Sarstedt et al. (2014) in determining if there is a correlation between the constructs. A multiple regression analysis using the latent variable scores as input was conducted to determine whether the internal model's collinearity difficulties could be resolved by constructing independent variables from the external latent variables (namely, E.A., UMG, SUD, URL, and IPD). The dependent variable, on the other hand, was Hangwurian City Development.

Similar to typical beta values in regression analysis, PLS model path coefficients were used in the same way. Because path coefficients are computed using ordinary least square regression, it was previously suggested that collinearity should be investigated. Hair et al. (2014) asserted that collinearity in the results of these analyses could indicate bias. For this reason, we followed Wong (2013) and Sarstedt et al. (2014) and checked to see if the two constructs were linked. Exogenous latent variables URL, SUD, E.A., and UMG were constructed as independent variables using latent variable scores for multiple regression to examine collinearity issues in the inner model.

The dependent variable in this study was HCD, and a path link was created between many exogenous latent components and their corresponding influence on it. Environmental consciousness, inclusive physical development (IPD), sustainable city development, urban liveability, and the development of *Hangwurian* City are all linked, according to research (HCD). Both the E.A.-to-HCD and UMG-to-HCD pathways were examined.

The outlined hypothesised path of the development of *Hangwurian* City and its endogenous variables, shows that the indicator variables of the proposed model is supported. The implication of this is that access to the city as typified by access to different parts of the city, access to mortgage facilities, access to urban transportation, and access of women to all parts of the city is a critical consideration when analysing urban spatial development. Another aspect of the hypothesised path of the *Hangwurian* city development is the aspect of consumption pattern in the development of the city. These is typified by waste management and recycling techniques, work safety, participation in infrastructure provision amongst others are the critical path of the *Hangwurian* model path which must be prioritised in the development agenda of the city space.

5. CONCLUSION

The analysis of the model significance of the research shows that a substantial number of the indicator variables of the constructs tested showed clear significance and applicability in the study area. A major essence of the research model is to ensure that the outcome of the model validation complied with extant literature and existing knowledge pool. This was also clearly established as Urban liveability (URL), sustainable development (SUD), inclusive physical development (IPD), environmental awareness (E.A.), and urban governance (UMG) were assessed in this study.

All of the individual constructs in the Hangwurian Model had an internal consistency of at least 0.70. To ensure that a construct is genuinely unique from other constructs, convergent validity and Composite Reliability were used to evaluate it. It is therefore recommended that:

The individual constructs of the model which are sustainable urban development, environmental awareness, urban liveability, urban management and governance, and inclusive physical development must be prioritised in the process of evaluating urban development which will prioritise the residents in the areas under consideration.

The Fornell and Larcker criterion suggests appropriate discriminant validity in evaluating these methods' results. The Henseler, Ringle, and Sarstedt heterotrait-monotrait (HTMT) ratio was also utilized. Analogous to typical beta values in regression analysis, PLS model path coefficients were similarly employed. The results indicated that Environmental Awareness (E.A.), Urban Management and Governance (UMG), Urban Liveability (URL), and Sustainable Urban Development (SUD) positively and significantly impact Hangwurian City Development (HCD).

Given that discriminant validity demonstrates the influence of the Hangwurian model's subconstructs, it is recommended that: In analyzing urban development, the various issues constituting the indicators for E.A. (Motivation, Environmental Knowledge), such as the regulation and modification of the utilization of environmental resources, must be addressed. Urban governance and management should also be prioritized to ensure that residents are informed of the challenges posed by the indiscriminate exploitation of space and its consequent effects. Furthermore, regulations must be applied in modifying the environment to ensure liveability, sustainability, and inclusiveness so that residents are assured of safe and resilient urban spaces that enhance the quality of life while being resilient and providing access for every class of people within the urban space to thrive.

It is imperative to acknowledge that Access to the City (ATC), Consumption Pattern (CSP), and Equity are pivotal values, as established by the research, for maintaining an urban environment that ensures safety, economic prosperity, and proper place shaping—core ideals of the Hangwurian Model for urban development.

This research concludes that urban development, though a complex process involving multiple modifications and value additions to human spaces, must be strategically approached. This approach should ensure that actions within the urban space foster the growth and development of all its components without detriment. Moreover, for sustainable urban infrastructure and inclusive physical development, it is essential to adopt the Hangwurian perspective, which evaluates development through the triads of consumption, access, and equity.

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