

Intellectual Stimulation and Its Effect on Organizational Innovation among Pharmaceutical Companies in Kwara State, Nigeria

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Abstract

This study examined intellectual stimulation and its effect on organizational innovation among selected pharmaceutical companies in Kwara State, Nigeria. Specifically, it examined the effect of intellectual stimulation on product innovation and assessed the extent to which intellectual stimulation affects process innovation among pharmaceutical organizations in the state. A survey research design was adopted, using a population of 1,113 and a sample of 286 staff members drawn from three selected pharmaceutical companies. Data were collected with a structured questionnaire, resulting in a 95.5% response rate, and were analyzed using PLS-SEM with SmartPLS. Reliability was assessed using composite reliability, while construct validity was evaluated through convergent validity ($AVE > 0.50$) and discriminant validity ($HTMT < 0.90$). Findings established statistically significant effects of empathy and mentoring on product innovation respectively ($\beta = 0.212$, $t = 3.588$, $p = 0.000 < 0.05$; $\beta = 0.232$, $t = 3.443$, $p = 0.001 < 0.05$). Findings also established statistically significant effects of mentoring and empathy on process innovation respectively ($\beta = 0.203$, $t = 3.006$, $p = 0.005 < 0.05$; $\beta = 0.142$, $t = 1.895$, $p = 0.048 < 0.05$). Based on the findings, the study concluded that intellectual stimulation through empathetic leadership and mentoring is effective for enhancing both product and process innovation. The study recommended structured mentoring programmes, adoption of empathetic leadership, and periodic innovation audits for sustainable organizational innovation.

Keywords: Intellectual Stimulation, Empathy, Mentoring, Organizational Innovation, Product Innovation, Process Innovation, PLS-SEM, Nigeria.

Introduction

Intellectual stimulation has surfaced as a crucial driver of innovation, especially in a knowledge-driven industry like pharmaceuticals, where innovation is crucial for developing products through efficient processes. This concept requires leaders to encourage creative and critical thinking among employees and to create a workplace where novel ideas and solutions thrive. According to Bass and Riggio (2019), organizations in the global world of today leverage intellectual stimulation to achieve improved product and process innovation and accelerate their competitiveness, especially when operating in a competitive industry.

This underscores the adoption of intellectual stimulation as a leadership practice in nurturing innovation for addressing the complex challenges associated with driving organizational innovation.

Furthermore, organizations in Africa, including those operating in the pharmaceutical industry, are faced with unique challenges, limited access to advanced technologies resulting from low innovative capabilities. However, studies such as that of Adusei et al (2022) noted that this problematic barrier can be mitigated through the promotion of adaptability and local innovations. Several organizations in Africa have successfully integrated mentoring programs to enhance production processes, and this has evidenced the efficacy of intellectual stimulation in driving innovation in disadvantaged settings like Africa. Despite these, research on the relationship between intellectual stimulation and organizational innovation remains minimal in many African countries, leaving a gap that studies like this can bridge.

In addition, Nigeria, which is the largest country in the whole of West Africa, presents an even compelling case for investigating the implications of intellectual stimulation on organizational innovation. The Pharmaceutical Sector in Nigeria relies largely on the importation of most of its production inputs, which is further completed by the inflow of counterfeit drugs (Ogunleye et al, 2020). While research has been conducted on intellectual stimulation by a few Nigerian researchers, research examining this concept in the context of pharmaceutical firms is scarce. This study, therefore, examined the effect of intellectual stimulation, with special interest in empathy and mentoring, on the organizational innovation of the pharmaceutical companies in Kwara State, Nigeria.

Statement of the Problem

Organizations today are operating in a highly competitive and innovation-driven environment where the need for stimulating the intellects of employees is becoming increasingly recognized as a major factor for organizational innovation. However, despite the associated benefits of intellectual stimulation, like improved creativity and problem-solving, pharmaceutical companies in developing countries like Nigeria often find it difficult to integrate intellectual stimulation strategies like empathy and mentoring into their leadership practices (Adusei et al., 2022). A major concern resulting from this is that it remains unclear whether these firms are fully leveraging intellectual stimulation to drive product innovation, such as new drugs and new service development.

In addition to product innovation, process innovation, which includes production techniques optimization and improving customer service delivery, has also been recognized as a prerequisite for operational efficiency and cost reduction (Ogunleye et al., 2020). Despite this recognition, there exists minimal research that evaluates how intellectual stimulation, especially through empathy and mentoring, contributes to organizational innovation. Also, limited existing studies on intellectual stimulation carried out by African and Nigerian researchers focused on other industries, but neglected the pharmaceutical sector, which this study found to be worth considering. Muthuri and Gilbert (2021) have

noted that adoption of a structured mentoring program can significantly improve manufacturing and distribution efficiencies. However, whether this submission also applies to the pharmaceutical sector of Kwara State remains underexplored. This study, therefore, focused on examining how intellectual stimulation affects organizational innovation using pharmaceutical companies in Kwara State as the study area.

Research Questions

This study was carried out to answer the following questions:

- i. How does intellectual stimulation affect product innovation among pharmaceutical organizations in Kwara State?
- ii. To what extent does intellectual stimulation have an effect on process innovation among pharmaceutical organizations in Kwara State?

Research Objectives

The main objective of this study is to examine intellectual stimulation and its effect on organizational innovation among pharmaceutical companies in Kwara State, Nigeria. The specific objectives were to:

- i. examine the effect of intellectual stimulation on product innovation among pharmaceutical organizations in Kwara State.
- ii. assess the extent to which intellectual stimulation has an effect on process innovation among pharmaceutical organizations in Kwara State.

Research Hypotheses

The hypotheses listed below were formulated to guide this study:

H₀₁: There is no significant effect of intellectual stimulation on product innovation among pharmaceutical organizations in Kwara State.

H₀₂: Intellectual stimulation has no significant effect on process innovation among pharmaceutical organizations in Kwara State.

Literature Review

Conceptual Review

Intellectual Stimulation

The concept of intellectual stimulation has attracted interest recently, especially among management researchers. Its connotation and conceptualization vary among authors, and this has given birth to various definitions of this concept. According to Tombari, Oparanma, and Tamunomiebi (2019), intellectual stimulation is conceptualized as the leaders' ability to inspire their followers to think outside the box in providing relevant solutions for solving organizational problems, thereby enhancing the creative and innovative capabilities of members. In another definition, Bass (1999), cited in Karuthi (2022), defined the term intellectual stimulation as the endowed capability of a leader that enables him to take risks,

solicits ideas from followers, and stimulates creativity and innovation through the instrumentality of tools like asking questions, critical thinking, and discovering superior means through which roles can be achieved. This definition is in concordance with that of Tombari et al. (2019), which also affirmed the role of leaders in facilitating critical thinking among subordinates and how this helps in facilitating problem-solving within organizations.

Contrary to the above-presented views on the conceptualization of intellectual stimulation is the connotation of Yukl (2013), who associated the origin of this concept with transformational leadership theory, by defining this concept as the behaviour of a transformational leader which enables them to influence followers to view organizational problems from an entirely new perspective and search for more creative remedies to identified problems. In support of this definition is the view of Northouse (2016) cited in Karuthi (2022), who also described intellectual stimulation as the process through which leaders expand their behaviour and magnify the intellectual capacity of their teams to handle challenging roles and develop creative solutions.

As Yukl (2013) previously confirmed, transformational leadership is the source of intellectual stimulation. Other authors, such as Peng et al. (2016), Jaroliya and Gyanchandani (2020), and Girardi and Rubim Sarate (2023), have confirmed that intellectual stimulation is a crucial element of transformational leadership and has the potential to significantly enhance organizational performance.

It is worth mentioning at this juncture that variations in authors' conceptualizations and origination of intellectual stimulation further account for the presentation of varying dimensions through which this concept can be understood. For this study, which examined the relationship between intellectual stimulation and organizational innovation, the independent construct is measured using empathy (understanding needs, listening, and identifying with feelings) and mentoring (sharing knowledge, imparting skills, and talent development).

Empathy

The term "empathy" was first used in 1909 by an English psychologist named Edward B. Titchener, who derived it from the German word "Einfühlung" (meaning "feeling into"). Accordingly, Rogers (1975) defines empathy as the ability to accurately perceive another person's internal frame of reference, together with the emotional elements and meanings associated with it, as though one were that person, while maintaining the "as if" condition. An easily understandable and concise definition was offered by Gentry, Weber, and Sadr (2007), defining empathy as being able to relate, experience, and understand the experiences, thoughts, or emotions of others. Sympathy is much simpler than empathy, which is being able to understand others and support them with both sensitivity and compassion. According to Abdulrahman and Castelli (2013), empathy is a fundamental aspect of leadership, since leadership involves the ability to possess and exhibit empathy by showing their followers that they care for both their needs and achievements.

According to a different perspective, empathy is the capacity of an individual to identify and comprehend the innate ideas, feelings, and viewpoints of others, as well as the ability to portray that understanding with care and concern. This definition is provided by the LSE Business Review (2022). According to Hosna, Islam, and Hamid (2021), empathy is the listener's attempt to hear another person honestly, deeply, and without passing judgment. This idea is in line with their viewpoint. The authors went on to explain that empathy requires skilled reflective listening that clarifies and amplifies the experience and meaning of the other person without imposing the listener's own content.

Researchers have established empathy as an important leadership trait. The Harvard Business Review (2021) has affirmed that empathetic leadership has a direct impact on employee engagement and retention. This is a product of fact, as Brown (2018) noted that empathy allows leaders to anticipate teams' needs, proactively address concerns, and create a culture that promotes psychological safety, which makes employees feel respected and valued.

Similar to other terminology used in the social sciences and business, different authors have different ideas about how empathy functions as an intellectually stimulating component. Pedro (2019) asserts that empathy is composed of two main parts, affective and cognitive, which grow throughout time as people become more conscious of the ideas and feelings of others. However, by distinguishing between cognitive (head/thinking), emotional (heart/feeling), and behavioral (action/doing), the LSE Business Review (2022) added a third element. A similar this is that of Bariso (2020), who identified cognitive, emotional, and compassionate empathy as the through major types of empathy. Cognitive empathy, according to Bariso (2020), involves the understanding of how people think and perceive situations; emotional empathy concerns the feeling of what others feel and sharing their emotional experience; compassionate empathy involves not only the feeling and understanding of others, but also taking concerted effort towards helping them.

Mentoring

One of the invaluable tools for empowering and developing competencies in individuals within organizations is mentoring. According to Pickett (2022), the origin of the term "Mentoring" can be traced back to Greek Mythology in the Epic Poem of Homer titled "The Odyssey," in which Odysseus, who was the king of Ithaca, went to the Trojan War while entrusting his kingdom to mentors who were the then teacher of Telemachus, Odysseus' son. The primary role of the Mentor was to train, educate, and develop the young prince towards fulfilling his birthright and becoming the King of Ithaca.

Adeyemi and Oke (2020) added that mentoring is among the few effective tools used by organizations to prepare for future skilled employees and to strengthen the capabilities, intelligence, knowledge, and competitive advantage of an organization.

Attaching a more experienced or competent individual to help a less experienced person improve and acquire particular competencies is known as mentoring. In addition to helping

individuals and groups hone their talents and abilities, mentoring also positively alters employees' skills to improve performance and organizational outcomes (Ayu, 2019).

Additionally, Opengart and Bierema (2015) define mentoring as a developmental interaction between a more seasoned person known as a mentor and a less seasoned person known as a protégé. To gradually grow the protégé, the connection is based on a tight relationship.

In addition to fostering team members' creativity and invention, mentoring helps an organization's socialization process (Allen et al., 2004). According to a more recent study by Adeniyi, Tende, and Emmanuel (2024), mentoring is a one-on-one developmental relationship that provides a comparable perspective to that of Opengart and Bierema (2015).

However, Ojedokun's (2011) definition offers a conception of the idea that names intellectual stimulation as one of mentoring's objectives. According to the author, mentoring is a methodical process wherein those with more position and reputation offer advice, support, and instruction to those chosen as protégées to foster their intellectual and professional development. Similarly, mentoring is described by Bodilenyane and Mooketsane (2019) as an intense relationship in which a senior or more experienced individual (the mentor) serves two purposes for a junior individual (the protégé or mentee): first, by offering advice or modeling regarding career development behaviors; and second, by providing personal support, particularly psycho-social support.

Therefore, mentoring covers all forms of activities targeted at developing personnel and ensuring that the organization is able to improve and maintain its organizational competitive advantage. According to Amanda and Akpana (2023), these activities include knowledge exchange, career help, and psychological support. They are considered aspects of mentoring. Information sharing, which is interchangeably used as knowledge sharing and implies sharing of intellectual capital such as work-related experience, expertise, know-how, and best practices that can be acquired and shared, psychological support is a mentoring dimension involved when subordinates and superior staff are supportive of the psychological and mental wellbeing of staff; career support implies a sense of purpose and direction that includes ideas of progression and development at both the work and personal level. Therefore, leaders must encourage a culture that fosters talent via information sharing, talent development, and talent motivation.

Organizational Innovation

A review of most existing literature revealed the availability of a variety of definitions of innovation. The variance among these definitions results from the fact that within organizations, perceived innovation is defined in various ways. Alharbi, Jamil, Mahmood, and Shaharoun (2019) define organizational innovation as the development and acceptance of a concept, idea, or behavior that is thought to be novel for an organization. Thus, organizational innovation entails the adoption of knowledge-based concepts and transformative behaviors.

Additionally, Le Bas, Mothe, and Nguyen-Thi (2015) offer a concise definition of organizational innovation that is consistent with our Alharbi et al. (2019) definition. Organizational innovation, according to Le Bas et al. (2015), is the acceptance of a novel concept or method within the company.

While Alharbi et al. (2019) and Le Bas et al. (2015) considered knowledge-based ideas and transformative behaviour as integral parts of organizational innovation, the study of Mohammad, Pedro, and Fayssal (2024) identified changes and improvements in organizational structure as core aspects of organizational innovation. According to Mohammad et al. (2024), organizational innovation entails changes and improvements in organizational structure, which may involve new forms of administration and managerial practices that facilitate innovation and strategic decision-making.

In contrast to the definitions provided above, Maryam (2019) offers a more comprehensive definition of the term "organizational innovation" as the introduction of something novel into organizational procedures. This could be a system, programme, policy, procedure, equipment, or service that has been purchased and is novel for the adopting organization. Based on the above definitions, discussing all types of organizational innovation would be difficult because authors vary in their views on its dimensions. However, OECD/Eurostat (2018) classifies innovation around product, process, marketing, and organizational activities. For the sake of this study, organizational innovation was measured using product innovation and process innovation as variables. The characteristics of these two forms of organizational innovation differ, as does their impact on variables relevant to the organization.

Product Innovation

This is the type of innovation that allows organizations to actualize competitive advantage by differentiating their products without compromising quality and by offering a variety of products that help organizations increase customer patronage and open doors for better growth opportunities. Olaru et al. (2016) conceptualize product innovation as the development of goods or services with enhanced features, or with usage that differs significantly from those of already existing products made by the organization or its competitors.

According to Asalu (2020), product innovation implies the introduction of new products or services to achieve external market or to satisfy users' needs. It involves the transformations in the services or products that an organization offers. This definition, therefore, considers product innovation as a strategic takes an already established market to the next level.

On the relationship between intellectual stimulation and innovation, while there is depth of literature on intellectual stimulation and product innovation, there is an observed scarcity of researches that examine the relationship and interconnectedness of the two variables. However, little existing literature, like that of Arthur and Priscilla (2022), observed that

management can use intellectual stimulation to encourage creativity and create an innovative business environment. In support of this is the conclusion in the study of Karuthi (2022), where it was also established that, as a critical component of transformative leadership, intellectual stimulation helps organizations to enhance innovative capabilities.

Process Innovation

Another type of innovation which organizations can adopt is process innovation, which implies the adoption of a new method of carrying out specific productive activities of an organization in a way that is distinctively different from the previous ways of carrying out such activities. A very succinct definition of process innovation was provided by Abubakar and Ismail (2014) as the implementation of a significantly improved or new method for production and delivery. Similar to Abubakar and Ismail (2014), Asalu (2020) defined process innovation as modifications to the process by which goods or services are developed and provided to the intended market. The author went on to clarify that process innovation is the incorporation of new components into an organization's production process or operations that are utilized to create a product or service, such as input materials, work and information flow, task specifications, and equipment.

In support of the view of Asalu (2020) presented above is the perspective of Maier et al. (2016), who also recognized process innovation as a significant change in specific techniques or production methods, equipment, or specialized software with the intention of achieving significant improvement in product quality and reducing production and distribution costs. Process innovation is also seen as the adoption of a radical process of change initiative in coming up with a novel way of implementing work activities.

Just like product innovation, process innovation, as a dimension of organizational innovation, could be realized through intellectual stimulation since employees are at the centre of the implementation of organizational innovation initiatives. Intellectual stimulation through the adoption of empathetic leadership and mentoring would help develop the affective, cognitive, and psychomotive state of mind and competencies required for effective implementation of product and process innovations within organizations.

Theoretical Review

This study is anchored on the transformative leadership theory of Downton (1973) and the diffusion of innovation theory of Rogers (2003). This is because intellectual stimulation, the independent construct of this research, is one of the core components of transformative leadership theory, while organizational innovation is well explained by the diffusion of innovation theory.

Transformative Leadership Theory

Downton first proposed this theory in 1973, but it gained popularity thanks to sociologist James MacGregor Burns' 1978 book "Leadership." Macgregor clarified the relationship

between leadership and followership in this book, stating that “leaders are people who tap the motives of followers to better reach the goals of leaders and followers,” as Northouse (2016) highlighted. By using this strategy, the leader can connect with followers by improving their morale and motivation, meeting their needs and goals, and helping them reach their greatest potential. According to Burns (2012), the leader and followers both gain from their interactions, which allow them to optimize the advantages.

According to Karuthi (2022), the transformative leadership theory is primarily based on the assumption that there are four major leadership pillars often referred to as the “Four I’s”. These include intellectual stimulation, idealized influence, inspirational motivation, and individualized consideration. Intellectual stimulation involves the leaders questioning the “this is the way we’ve always done things” mentality. They act against the established status quo and question the presumptions of seasoned leaders.

Transformative leaders accomplish this by instilling their attitude in their staff members by promoting fresh perspectives, opportunities, and experiences. Instead of concentrating on the results of the efforts, transformative leaders highlight the chances for employees to develop and learn as a means of igniting their intellectual curiosity. Instead of playing it safe, these leaders make care to eliminate the “fear factor” from tasks assigned to staff members and motivate them to keep learning and to seek out and seize possibilities.

On individualized consideration, this is a leadership training that is concerned with the ability of the leader to internalize institutional culture into employees by giving them a feeling of ownership in organizational goals and a feeling of independence in the workplace. Inspirational motivation, however, involves leaders imparting a vision that is appealing and worthy to employees. This is done through a well-communicated vision internalized by followers, and makes the goal of achieving that vision their own. This is done by giving employees a sense of strong sense of purpose and setting high standards and expectations for achievement. Idealized influence, which is the last component of the transformative leadership style, involves the leader serving as a role model to employees in every way. Leaders can do this by modeling ethical and socially desirable behaviour, maintaining a dedication to work goals, and exhibiting enthusiasm about strategic implementation.

This approach has drawn criticism for linking leadership style alone to an organization's success.

Karuthi (2022) asserts that elements, including team psychology, training and skill development, the current workplace, and other individual aspects, can either favorably or unfavorably affect an organization's effectiveness. Despite this criticism, transformational leadership theory remains the most relevant theory to this study, having successfully explained the linkage between intellectual stimulation and performance and how creativity and innovation could be enhanced within an organization through intellectual stimulation.

Empirical Review

The fact that intellectual stimulation enjoys popularity through transformative leadership makes it an area of study that attracts scholars' attention. Several studies have been carried out to explain the relationship between intellectual stimulation and some management and organizational-related variables. One such study is that of Kathuri (2022), which examined intellectual stimulation for technological innovation conducted using an in-depth literature review. The researcher carried out an in-depth conceptual, theoretical, and empirical review of relevant literature to provide a better understanding of intellectual stimulation and technological innovation, which were the study's independent and dependent constructs, respectively. Relying on the studies reviewed, the study proposed a theoretical model that relates intellectual stimulation to technological innovation. The study concluded that there is a unanimous opinion among scholars that intellectual stimulation, as a key component of transformational leadership, influences both technological innovation and overall organizational performance.

Also, Arthur and Priscilla (2022) assessed how intellectual stimulation influences the performance of Kenya Airways. A descriptive research design is used with a population that consists of employees of Kenya Airways. The respondents were sampled using a proportionate sampling technique, while the required data were gathered using open and closed structured questionnaires. A descriptive statistical tool was used for the initial presentation of the data gathered, while the test of the proposed study hypotheses was conducted using multiple regressions. Findings from the study established that intellectual stimulation has a significant positive impact on performance. The study therefore commended enhanced intellectual stimulation, provision of an innovative environment, encouragement of employee creativity, and encouragement of independent decision-making.

The results of a study by Tombari et al. (2019) on the organizational performance and intellectual stimulation of three- and four-star hotels in Port Harcourt, Nigeria, are consistent with the findings of Arthur and Priscilla (2022). The study used a quantitative research approach and a survey research design, employing a structured questionnaire to extract the necessary data from the study sample of 293 employees selected from the total population of 1085 employees of the three- and four-star hotels in Port Harcourt, Nigeria. The Cronbach's Alpha coefficient test was used to assess the reliability of the collected data, and the Taro Yamane method was used to estimate the chosen sample size. With the use of the Statistical Package for Social Sciences, Pearson's Correlation test was used to test the suggested hypotheses. The study's conclusions demonstrated a statistically significant positive correlation between the organizational performance of three- and four-star hotels in Port Harcourt, Nigeria, and intellectual stimulation. Therefore, the study suggested that critical thinking be stimulated before making decisions, that creativity and innovation in problem-solving be encouraged, and that innovation be supported by problem-solving techniques.

Based on the review of relevant existing literature, it was observed that there seems to be a unanimous opinion that intellectual stimulation positively impacts performance. However, the authenticity of this position when considering the pharmaceutical industry as a study area is a research area yet to be observed, especially in the Nigerian context. This study will bridge this gap by examining how intellectual stimulation relates to organizational innovation using pharmaceutical organizations in Kwara State, Nigeria, as the study area. From the perspective of diffusion of innovation theory, empathy and mentoring are also relevant because they improve communication channels, reduce uncertainty, and encourage the social learning through which new product and process ideas are adopted within organizations.

Conceptual Framework

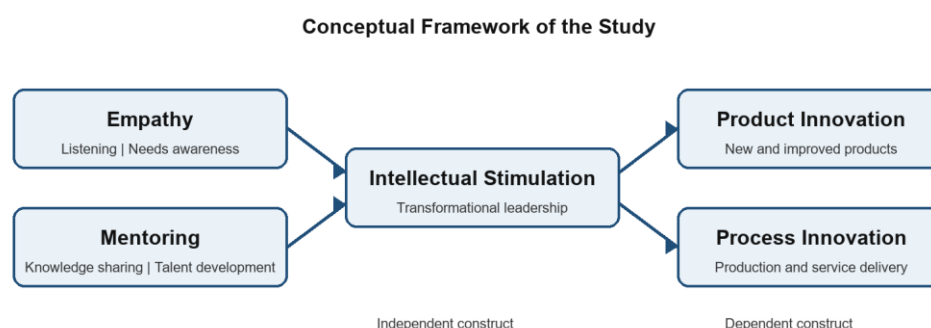


Figure 1: Conceptual Framework of the Study

Methodology

Research Design

This study adopted a survey research design using a quantitative research approach. This adoption of a quantitative research approach allows the researcher to elicit numeric data that can be statistically analyzed to ascertain the study constructs and to carry out appropriate tests of the proposed study hypotheses. Also, considering the nature of the study construct and its respective variables and sub-variables, adoption of a survey research design and a quantitative research method will help to provide evidence-based conclusions on this study.

Population of the Study

The study population consists of all staff of selected pharmaceutical firms in Kwara State. The selected pharmaceutical firms include Tuyil Pharmaceutical Industries Ltd, Bioraj Pharmaceuticals Ltd, and Peace Standard Pharmaceutical Industry Nigeria Ltd, with staff strengths of 582, 137, and 394, respectively, which were considered for this study because of their high staff strength among other active operating pharmaceutical firms in Kwara State, Nigeria. This, therefore, made the total population considered for this study 1,113.

Sample Size Determination

Since the population size of 1,113 is significantly large, the determination of the required sample size, which would be a good representation of the study population, is required. For this study, the Yamane sample size formula, $n = N/[1 + N(e)^2]$, was applied at a 95% confidence level and 5% margin of error. With $N = 1,113$ and $e = 0.05$, the estimated sample size was approximately 286. Hence, a sample size of 286 was drawn from the total population of 1,113 and appropriately used for this study.

However, since the respondents were spread across three pharmaceutical firms in Kwara State, the required sample from the population size of each of the selected organizations was proportionately determined by dividing the staff strength of each organization by the total staff strength of the three organizations, divided by the estimated sample size (i.e., 286). Based on this, the staff strength and the number of sample members required from each of the organizations are presented in Table 1 below:

Table 1: Population and sample size estimated

	Tuyil Pharmaceutical Industries Ltd	Bioraj Pharmaceuticals Ltd	Peace Standard Pharmaceutical Ind. Nig. Ltd	Total
N	582	137	394	1,113
n	149.5	35	101	286

Source: Researcher's Population & Sample Estimates, 2026

Sampling Technique

The estimated number of sample members for each of the organizations was selected using proportionate stratified sampling. This is because the respondents were drawn proportionately from the three selected pharmaceutical firms based on their respective staff strengths, thereby ensuring that each organization was represented in the sample according to its share of the study population.

Research Instrument

In order to collect the required data from the study respondents, this study adopted the use of a closed-ended questionnaire. The question was designed specially based on the study constructs (Intellectual Stimulation and Organizational Innovation) and their respective variables. This is done by using empathy and mentoring for measuring the independent construct "Intellectual Stimulation", and using product innovation and process innovation for measuring the dependent construct "Organizational Innovation". Empathy and mentoring and their respective indicators used for measuring "Intellectual Stimulation" were adopted from the study of Karuthi (2022). The independent construct "Organizational Innovation" was also measured using the scale designed by Asalu (2020), where organizational innovation was measured using product innovation, process innovation, and managerial innovation. While 286 copies of the question were administered, 273 copies were recovered, making a 95.5% response rate.

Reliability and Validity of the Instrument

A reliability test is used in research to test the internal consistency of the data gathered. For this study, Composite Reliability (CR) and Cronbach's Alpha tests were used for the reliability of the study instrument. Using this method, coefficients equal to or greater than 0.70 are considered indications that the indicators have an acceptable level of internal consistency; hence, indicators with reliability coefficients below the threshold were reviewed before final model estimation. However, the validity of the research instrument was tested using Convergent Validity and Discriminant Validity. Convergent validity measures how well indicators measure their respective latent variables. This is done by evaluating the estimated Average Variance Extracted (AVE). AVE value above 0.50 suggests that a construct explains more than half of its indicators. For this study, all the estimated AVEs were above 0.50 (i.e., $AVE > 0.50$), hence all instruments are valid. Discriminant validity, on the other hand, was tested using the Fornell-Larcker Criterion and Heterotrait-Monotrait Ratio (HTMT). The Fornell-Larcker Criterion requires that the square root of AVE for each construct must be greater than its correlations with other constructs. This has been established as the square root of AVE estimated for all constructs of this study was greater than their correlations with other constructs. Using HTMT, values less than 0.90 are an indication that discriminant validity is established. The estimated HTMT values, which are less than the threshold of 0.90 estimated in this study, indicate significantly high discriminant validity. These statistical tests of reliability and validity were carried out with the aid of SmartPLS 3.2.9.

Method of Data Analysis

The analysis of the gathered data was conducted using the Partial Least Squares Structural Equation Modelling (PLS-SEM) with the aid of SmartPLS Version 3.2.9. to assess both the outer measurement model and the inner structural model. The ability to evaluate all paths concurrently makes this work relevant (Hair et al., 2020). Using this method, the structural model will be assessed by considering the Path Coefficients, R-squared (R^2), Q-squared (Q^2), and Model Fit. Path coefficients were generated to get the p-value (which represents the strength and direction of the relationship between the predictors and variables) from bootstrapping of the path coefficients between the latent variables of the study. The R^2 is used to evaluate the explanatory power of the model for endogenous latent variables. The Q^2 is used in this study to assess the predictive relevance of the model using a blindfolding procedure, and the high Q^2 values estimated, which are greater than zero, indicate predictive relevance of the predictors and variables used in this study. The overall fitness of the model is determined using the estimated Standardized Root Mean Square Residual (SRMR). The estimated SRMR values less than 0.08 indicate that the model is fit.

Results and Discussions

Measurement Model Evaluation

The measurement model of this study presents the relationships between the constructs and their respective indicators of the variables used for measuring them. Indicators having low estimated factor loadings (< 0.60) were removed. The first element of the measurement model of this research is reliability analysis using composite reliability, for which the acceptable threshold value is 0.70 (Hair et al., 2022). Consequently, data presented in Table 2 revealed that all the latent constructs of the model possess composite reliability as evidenced by the CR values of 0.820, 0.859, 0.869, and 0.905, which are greater than the threshold of 0.70 ($CR > 0.70$).

Table 2: Factor Loadings, Reliability, and Validity

Variables/Indicators	Factor Loading	Alpha	CR	AVE
Empathy		0.677	0.820	0.605
EMT ₁ (Listening)	0.841			
EMT ₂ (Needs awareness)	0.758			
EMT ₄ (Emotional understanding)	0.730			
Mentoring		0.760	0.859	0.673
MTR ₂ (Knowledge sharing)	0.698			
MTR ₃ (Talent development)	0.846			
MTR ₄ (Talent motivation)	0.904			
Product Innovation		0.773	0.869	0.689
PRS ₁ (New Product)	0.847			
PRS ₂ (Improved Product)	0.922			
PRS ₃ (Service Innovation)	0.845			
Process Innovation		0.841	0.905	0.760
PRT ₁ (Efficient production technique)	0.755			
PRT ₂ (Distribution channel efficiency)	0.871			
PRT ₄ (Improved customer service delivery)	0.859			

Source: SmartPLS Output, 2026

Table 2 above presents the factor loadings, reliability, and validity results of this study. These factor loadings and their respective p-values are presented in Figure 2 below. The second element of the measurement model of this research is convergent validity, which is tested using Average Variance Extracted (AVE), with a cut-off criterion value of 0.50. Since all the constructs used in this table show AVE values (0.605, 0.673, 0.689, and 0.760) greater than the cut-off criterion value of 0.50 (i.e., $AVE > 0.50$), as contained in Table 2 above, the constructs have convergent validity. On the discriminant validity of the constructs, this was evaluated using the Heterotrait-Monotrait Ratio (HTMT). According to Henseler et al. (2015), to ascertain discriminant validity, the conservative threshold value of the HTMT ratio must be less than or equal to 0.90, as presented in Table 3, where all estimated HTMT

values were significantly lower than the threshold of 0.90, indicating that discriminant validity is achieved.

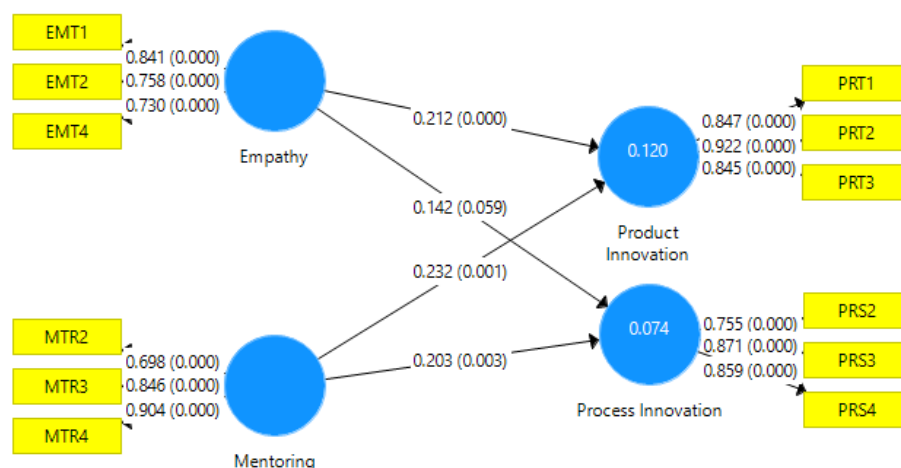


Figure 2: PLS-SEM Bootstrapping Results for the Measurement and Structural Model

Table 3: Discriminant Validity Using Heterotrait-Monotrait Ratio (HTMT)

	Empathy	Mentoring	Process Innovation	Product Innovation
Empathy				
Mentoring	0.299			
Process Innovation	0.250	0.289		
Product Innovation	0.340	0.333	0.259	

Source: SmartPLS Output, 2026

Structural Model Evaluation

To determine the coefficient of determination (R^2), predictive relevance (Q^2), and Beta coefficients (β), a structural path model is used. To obtain these values, bootstrapping was performed using 500 samples with the aid of SmartPLS 3.2.9 to measure the path coefficients, t-values, and standard errors required for determining the direct significant relationships between the variables of the formulated hypotheses (Hair et al., 2022). Although the 500 bootstrap samples used in the original estimation produced interpretable results, the number is below the 5,000 bootstrap subsamples commonly recommended for more stable PLS-SEM inference; this is acknowledged as a methodological limitation and should be improved in future replication. After the computation of the coefficient path to evaluate the interactions between the variables as determined by the various indicators, the following results were obtained on the test of the two proposed hypotheses:

H₀: There is no significant effect of intellectual stimulation on product innovation among pharmaceutical organizations in Kwara State.

The path coefficient with respect to the first proposed hypothesis, as presented in Table 4, established that empathy and mentoring used in this study as variables for measuring intellectual stimulation collectively predict 12% variance in product innovation.

Table 4: Structural Path Coefficients for Product Innovation

	Path Coefficient (β)	Standard Deviation	T-Statistic	P Values	R ²	Q ²
Empathy -> Product Innovation	0.212	0.059	3.588	0.000	0.120	0.085
Mentoring -> Product Innovation	0.232	0.067	3.443	0.001		

Source: SmartPLS Output, 2026

Result presented on the test of the first hypothesis presented in Table 4 also established that all factor loadings from the indicators of empathy (EMT₁, EMT₂, EMT₄) as a variable of intellectual stimulation, which are contained in Table 2, contribute significantly to product innovation ($\beta = 0.212$, $t = 3.588$, $p = 0.000 < 0.05$). This is evidenced by the P-value of .000, which is less than the threshold of 0.05, indicating that the path coefficient is statistically significant. It was also found that all factor loadings in Table 2, which are indicators of mentoring (MTR₂, MTR₃, MTR₄) as a variable of intellectual stimulation, contribute significantly to product innovation ($\beta = 0.232$, $t = 3.443$, $p = 0.001 < 0.05$). This is also evidenced by the estimated p-value of 0.001, which is less than the threshold of 0.05. The estimated Q² value of 0.085, which is greater than 0 ($Q^2 > 0$), guaranteed predictive relevance of the model. Based on these, the first proposed hypothesis, which states that "There is no significant effect of intellectual stimulation on product innovation among employees in pharmaceutical organizations in Kwara State," is rejected, while its alternative is accepted. Therefore, there is a significant effect of intellectual stimulation on product innovation among employees in pharmaceutical organizations in Kwara State.

H₀₂: Intellectual stimulation has no significant effect on process innovation among employees in pharmaceutical organizations in Kwara State.

Table 5 below presents the path coefficients with respect to the second proposed hypothesis. Results contained therein established that intellectual stimulation, measured using variables like empathy and mentoring, collectively predicts 7.4% variance in process innovation.

Table 5: Structural Path Coefficients for Process Innovation

	Path Coefficient (β)	Standard Deviation	T-Statistics	P Values	R ²	Q ²
Empathy -> Process Innovation	0.142	0.075	1.895	0.048	0.074	0.046

	Path Coefficient (β)	Standard Deviation	T-Statistics	P Values	R ²	Q ²
Mentoring -> Process Innovation	0.203	0.068	3.006	0.005		

Source: SmartPLS Output, 2026

The path coefficients presented in Table 5 show that all factor loadings from the indicators of empathy (EMT₁, EMT₂, and EMT₄) as a measure of intellectual stimulation collectively contribute 14.2% to unit increase in process innovation, which is significant as affirmed by the p-value of 0.048 ($\beta = 0.142$, $t = 1.895$, $p = 0.048 < 0.05$). The statistically significant p-value of 0.048, which is less than 0.05, indicates that the path coefficient is statistically significant. Results in Table 5 also revealed that all factor loadings from the indicators of mentoring (MTR₂, MTR₃, and MTR₄) as a measure of intellectual stimulation collectively contribute 20.3% to process innovation, and this is also statistically significant as evidenced by the estimated p-value of 0.005 ($\beta = 0.203$, $t = 3.006$, $p = 0.005 < 0.05$). The statistically significant p-value of 0.005, which is less than 0.05, indicates that the path coefficient is statistically significant. Furthermore, the Q₂ value of 0.046 is greater than 0 ($Q_2 > 0$), and this guaranteed the predictive relevance of the model. Relying on these, the second proposed hypothesis, which states that "Intellectual stimulation has no significant effect on process innovation among employees in pharmaceutical organizations in Kwara State," is rejected, while its alternative is accepted. Hence, intellectual stimulation has a statistically significant effect on process innovation among employees in pharmaceutical organizations in Kwara State.

Discussion of Findings

This study investigated the effect of intellectual stimulation (measured using empathy and mentoring) on organizational innovation (measured using product and process innovation) among pharmaceutical companies in Kwara State. Findings affirmed that intellectual stimulation has the potential to significantly enhance product innovation, with path coefficients (β) of 0.212 and 0.232 estimated for empathy and mentoring, respectively, with p-values less than the critical value ($p < 0.05$). This finding is in line with the position in the study of Bass and Riggio (2019), where it was also established that leaders who consider empathy and mentoring as part of their leadership practices often stimulate creative problem-solving, which leads to product-related innovations. Also, the high factor loading estimated for talent motivation (MTR₄ = 0.904) further suggests that motivational leadership could also be an effective driver of product innovation. From the diffusion of innovation perspective (Rogers, 2003), empathetic leadership and mentoring can operate as communication and social-learning mechanisms through which employees understand, accept, and routinize new product ideas. However, the Q₂ value of 0.085, which is greater than 0 ($Q_2 > 0$), affirmed the predictive relevance of the model and shows that the model is

not just statistically significant but also practically applicable for innovation in product development in manufacturing organizations, including those in the pharmaceutical sector. Furthermore, findings also established that intellectual stimulation has a statistically significant influence on process innovation as evidenced by the path coefficients (β) of 0.142 and 0.203 estimated for empathy and mentoring, respectively, and statistically significant ($p < 0.05$), and collectively accounted for 7.4% variance in process innovation ($R^2 = 0.074$). Although the observed R^2 is smaller than that of product innovation (i.e., $0.074 < 0.120$), the relevance of mentoring in enhancing operational efficiency can still be deduced from the findings, as observed from the high factor loading estimated for distribution channel efficiency ($PRT_2 = 0.871$). The finding of Muthuri and Gilbert (2021) resonates with this finding as it established that manufacturing efficiency can be enhanced through structured mentoring. Diffusion of innovation theory also clarifies this result by suggesting that process innovation spreads more effectively when employees receive credible guidance, observe workable practices, and obtain support during implementation. This study also deduced from the low R^2 value of 0.074 that other factors, such as technological infrastructure and regulatory policies that are not in the study model, may be effective for actualizing improved process innovation, hence serving as a study gap to be filled by future researchers. However, despite the low R^2 estimated, the predictive relevance of the model is evidenced by the Q^2 value of 0.046, which is greater than 0 ($Q^2 > 0$), affirming that intellectual stimulation remains an effective strategy to be adopted for achieving process innovation in organizations.

Conclusion and Recommendations

Based on the study findings, it was concluded that with the integration of empathy and mentoring in efforts directed towards intellectual stimulation, both product and process innovation can be significantly enhanced in pharmaceutical companies in Kwara State, Nigeria, and beyond. The first objective was addressed by the evidence that empathy and mentoring significantly affect product innovation, while the second objective was addressed by the evidence that both dimensions of intellectual stimulation also significantly affect process innovation. The conclusion further aligns with diffusion of innovation theory by showing that innovation is strengthened when leaders provide communication, support, and mentoring systems that help employees adopt new ideas and practices. Relying on the study findings and conclusion, this study recommends the following:

1. **Structured Mentoring Programs:** Leaders and management of manufacturing organizations, including pharmaceutical companies, should consider the establishment of a formal mentoring initiative to facilitate talent development and knowledge sharing and as a strategic tool for employee motivation and promotion of a culture that facilitates organizational innovation.
2. **Adoption of Empathetic Leadership:** Efforts should be directed towards making significant investments in leadership training programs that integrate active

listening, emotional intelligence, and employee needs awareness. This will equip leaders with the required skills for understanding employees and developing their creative and problem-solving skills for enhanced organizational innovation.

Periodic Innovation Audit: Organizations should consider periodic evaluation of their innovation processes as a strategic move for the identification of innovation gaps and opportunities, and leverage intellectual stimulation for achieving sustainable growth.

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