

Educational Diversity and Product Innovation in Manufacturing Firms in Calabar, Cross River State

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Abstract

The cross-sectional survey examined the effect of knowledge sharing diversity, continuous learning diversity, and educational attainment diversity on new product development in manufacturing firms in Calabar, Cross River State. A Cognitive Learning Theory (CLT) was adopted to explain learning as a process where information is structured, organized, and retrieved to accommodate different backgrounds. A structured questionnaire was used to facilitate data collection. Content and face validity, and Cronbach's alpha reliability were used to ascertain the reliability of the data. Descriptive statistics and multicollinearity with the variance inflation factor (VIF) were used to ascertain the accuracy of the data set. The hypotheses were tested using multiple regression analysis. Findings revealed that knowledge sharing diversity (Beta = 0.672, $P < 0.05$), continuous learning diversity (Beta = 0.661, $P < 0.05$), and educational attainment diversity (Beta = 0.672, $P < 0.05$) significantly affect new product development in manufacturing firms. The study concluded that the combination of vocational expertise, business and technical skills enhances the operational growth of manufacturing firms. It was recommended that the HR manager should continuously design policies that promote knowledge sharing to drive product development through the combination of expertise and skills to build and solve problems that affect product launch. The HR manager should prioritize continuous learning to spark creativity, accelerate the firm's adaptation to market shifts, and improve problem-solving to achieve new product development. The HR manager should commit to educational attainment diversity to have a mix of various academic fields to enhance product development, overcome technical challenges, accelerate innovative design, and broaden collective knowledge.

Keywords: *Knowledge sharing diversity, Continuous learning diversity, and Educational attainment diversity*

Introduction

The sustainability of global career readiness and cognitive growth is driven by educational diversity in the 21st century, which enhances unique learning styles. This has brought together teams with diverse skill sets, academic backgrounds, and disciplines, catalyzing product innovation (Gupta et al., 2025). The combination of various fields of expertise has improved novel solutions and expanded individual perspectives on critical thinking. Educational diversity enhances the success of a globalized workforce by fostering cross-cultural competence, mutual trust, and open-mindedness. Product innovation in manufacturing firms is driven by educational diversity, which has improved productivity, competitive advantage, and driven market growth. In recent times, the combination of knowledge base, skills, and cognitive styles has helped to drive product innovation (Schubert & Tavassoli, 2024). This

indicates that creative problem-solving capacity is driven by a mix of educational background diversity. The effectiveness of educational diversity in manufacturing firms consists of knowledge diversity, continuous learning diversity, and educational attainment diversity. Knowledge diversity impacts new product development in manufacturing through the firms' commitment to creativity and problem-solving (Garcia-Perez et al., 2020). The practice of continuous learning diversity relates to a commitment to build knowledge, skills, and inclusive behaviour of people from diverse perspectives, backgrounds, and cognitive styles (Rajabalee et al., 2022). Educational diversity is the mix of team members with numerous types of schooling aimed at boosting new product development through creativity and development of problem-solving skills (Sharma et al., 2023). In manufacturing firms, the implementation of educational diversity has enhanced problem-solving, improved decision-making, and enhanced innovativeness in teamwork. The mix of various academic backgrounds has helped workgroups to handle complex challenges through the combination of theoretical knowledge and practical skills (Sultana et al., 2022). Today, a rich knowledge base requires formal training to ensure technical challenges are resolved through the combination of specialized knowledge so that firms can scale operations effectively and efficiently, and adapt to market changes. Based on this notion, this study becomes a resource to identify the effect of educational diversity on product innovation in manufacturing firms in Cross River State.

Statement of the problem

The issue confronting educational diversity in manufacturing firms is the inability to balance the qualification levels, knowledge, and skill sets. This is caused by educational mismatch, integration challenges, and barriers associated with communication, which lowers team problem-solving and reduces trust caused by misunderstanding.

In manufacturing firms in Calabar, educational diversity is affected by ineffective knowledge sharing, lack of continuous learning diversity, and poor educational attainment diversity in new product development. In diverse groups, ineffective knowledge sharing emanates from cultural friction, lack of psychological safety, and communication barriers, which reduce innovation, hinder team growth, and cause misunderstanding. The lack of continuous learning diversity causes stagnation in innovation. Lastly, the issue of poor educational attainment diversity is caused by social exclusion and resource inequality due to disparities that harm personal growth. Based on these setbacks, this study seeks to examine the educational diversity and product innovation in manufacturing firms in Calabar, Cross River State.

Objectives of the study

The specific objectives are:

1. To examine the effect of knowledge sharing diversity on new product development in manufacturing firms in Calabar, Cross River State
2. To assess the effect of continuous learning diversity on new product development in manufacturing firms in Calabar, Cross River State
3. To investigate the effect of educational attainment diversity on new product development in manufacturing firms in Calabar, Cross River State

Theoretical framework

This study is anchored on the Cognitive Learning Theory (CLT) developed by Jean Piaget in 1936, and was further developed by Albert Bandura and Aaron Beck in 1960. The theory explains that during learning, the human brain is engaged in storing, processing, and retrieving information. This aids in building knowledge and tailoring instruction to diverse cultural backgrounds with cognitive strengthening.

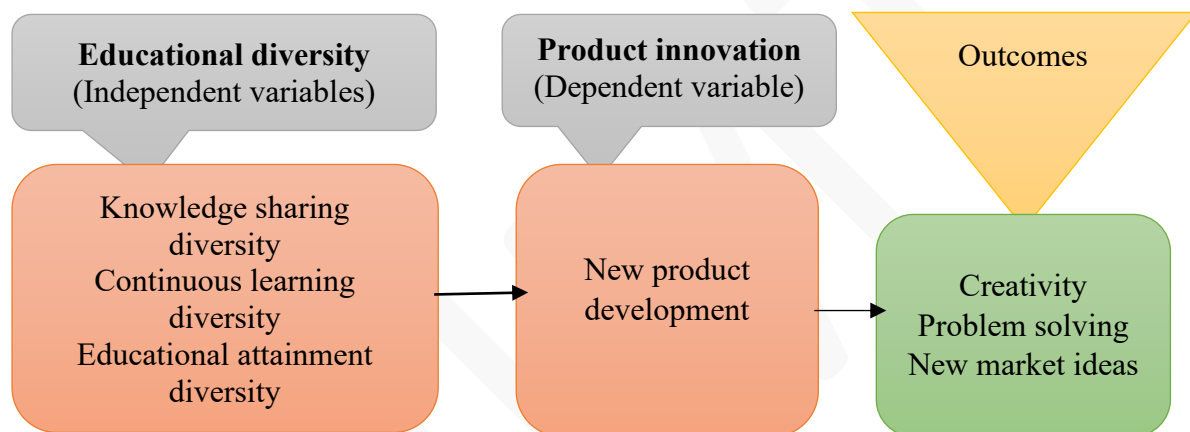
The theory assumes that learning is a process where information is structured, organized, and retrieved to accommodate different backgrounds. The human minds are involving in organizing information based on the internal mental structure

The justification of the theory for the study is that it supports the practice of knowledge sharing diversity, continuous learning diversity, and educational attainment diversity to enhance new product development. The theory is important because in educational diversity, it helped to ensure that issues on individual mental profiles is addressed to promote equity. Hence, it allows the use of memory attention in problem solving

Conceptual framework

The conceptual framework of the study was based on the researcher idea of the concept of educational diversity. The framework covered knowledge sharing diversity, continuous learning diversity, and educational attainment diversity, and product innovation measured by new product development as shown below:

Fig 1: Educational diversity in manufacturing firm



Source: Author 2026

Concept of educational diversity

The concept of educational diversity is multifaceted, as many authors have various perceptions. In various sectors, educational diversity has a significant effect on the performance of employees and has gained prominence as organizations leverage various skills and knowledge that enhance adaptability and innovation. Educational diversity relates to a workforce of mixed academic backgrounds based on technical and vocational training. Educational diversity accelerates innovation, boosts operational efficiency, and drives problem-solving. Wang (2022) conceptualizes it as differences in qualification, skills, training, and experience among workers. According to Alshemmari and Monawer (2023), it relates to technical experience, professional qualification, and soft skills. A study by Sultana et al. (2022) stressed that employee diversity is affected by educational diversity, and a significant relationship exists between educational diversity and worker productivity in banks.

Today, group performance is affected by the type of diverse capabilities that enhance a wide variety of talent. Therefore, the accomplishment of organizational goals is influenced by the educational background of the workers. Educational diversity enhances skills and knowledge through formal training to improve productivity. This is because the employability of an individual is influenced by educational background across organizational job settings. A study by Nakoby et al (2019) reveals that an individual is unable to perform an assigned task without an appropriate educational background; this affirms that knowledgeable employees can perform tasks efficiently and effectively. However, the existence of different educational levels is associated with varying mobility rates. For instance, different occupations exist for people with different levels of education, and organizational productivity depends on the acquisition

of different levels of education. Emiko and Eunmi (2019) are of the view that the productivity of an individual depends on education, particularly in an area where there is tertiary education, and this will improve the wages of individuals due to skill. On the other hand, employees with poor education will have low skills and training for the performance of tasks.

Knowledge sharing diversity and new product development

Knowledge diversity impacts new product development in manufacturing through the firms' commitment to creativity and problem solving. This is because the mix of diverse perspectives of the team and backgrounds offers divergent thinking on product development. According to Garcia-Perez et al. (2020), harnessing the various market and technical insights allows the team to identify unique demand of customers that a homogeneous group lacks. In addition, effective evaluation of market, technology, and operational roadblocks is identified early by the existence of diverse expertise. A study by (Rehman et al., 2021) stressed that knowledge sharing allows knowledge to be generated through the collection of existing and appropriate information to expand knowledge. For instance, sharing the understanding of product development is associated with the belief that the goal of the organization can be achieved successfully (Akhtar et al., 2022). Knowledge sharing diversity involves the organization and network of personnel, which are critical for knowledge accessibility. The network ensures that knowledge is accessed to improve work productivity and the development of products. Jiao et al. (2019) add that the practice of knowledge sharing commands and compels people to share knowledge they possess. In new product development, knowledge sharing diversity involves the need to acquire, arrange, recycle, and communicate knowledge based on experience. This creates opportunities to enhance organizational ability to enhance knowledge to address market requirements and achieve competitive advantage in the market.

Continuous learning-diversity and new product development

Continuous learning and new product development are drivers of business innovation in the 21st century, which enable the work team to build creativity in problem solving, adapt to fast changing market and develop user-centered products (Rajabalee et al., 2022).

The practice of continuous learning diversity relates to a commitment to build knowledge, skills, and inclusive behaviour of people from diverse perspectives, backgrounds, and cognitive styles. It harnesses personal growth, human experience, and learning methods to ensure the organization achieves its set goals (Amin, 2019). Continuous learning in a diverse environment enhances problem-solving, improves personal growth, and teamwork. The need for continuous learning in manufacturing reduces bias and helps in building a fair workplace.

The benefits of continuous learning and diversity allow workers from various backgrounds to share positive views that could lead to creative problem-solving. Through continuous learning, workers can fix unfair habits that affect the growth of the organization. According to Chukwuemeka et al. (2018), workers can adjust to new tools in a changing environment. With continuous learning, organizations and individuals can remain competitive, adapt to changes in the industry, develop confidence, and meet changes in the industry. The investment in learning initiatives exposes the industry standards and improves productivity with compliance. Today, future work demands are exposed to employees through continuous learning and are prepared to support the performance of the organization's employees. A study by Zhang et al. (2022) indicates that about 94 percent of workers remain committed to tasks when having access to learning and development opportunities. This is because the professional growth of workers is influenced by continuous learning. This, in a way, equips workers with knowledge and skills, builds new confidence skills, and ensures that changes in the work environment are addressed.

Educational attainment diversity and new product development

Educational diversity is the mix of team members with numerous types of schooling aimed at boosting new product development through creativity and development of problem-solving skills. According to Sharma et al. (2023), educational attainment reduces group biases, drives social equity, and proffers solutions to problems. The need for educational attainment diversity ensures that the workforce builds the required cross-cultural skills, has fair access and support for inclusive growth the importance of innovation and creativity through educational attainment ensures that teams with various educational backgrounds harness their financial insight, technical and marketing skills to explore new product development. Muturi (2024) stresses that the launch of new products and new concepts is influenced by vertical education diversity, which enhances firms' capability to explore potential. Hence, teams with diverse learning paths can view problems in new ways Investing in education enhances educational attainment levels, which promote innovation and drive economic development in the long term (Hanushek & Woessmann, 2022). Today, human capital formation is influenced by education, which fosters economic competitiveness and stimulates innovation, resulting in a higher standard of living. This indicates that the diversity in educational attainment promotes the well-being of individuals, and sustainable economic growth is derived from it. According to Li and Wu (2022), educational attainment equips individuals with critical thinking abilities needed for the development and implementation of new technologies. This implies the need for an educated workforce to be used to increase productivity, problem-solving, and experimentation

Measure for product innovation

The practice of product innovation influences market growth for profit turnover, market share expansion, competitive advantage, and higher sales. Today, how a firm competes is determined by the nature of product innovation (Droge et al., 2020). However, the concept of product innovation is measured by new product development. New product development in a manufacturing firm increases revenue, boosts market share, and drives business growth. For instance, stagnation in firms is prevented by a firm's new revenue streams; it offers a competitive edge with unique and modern solutions; and offers better customer alignment with continuous innovation (David-West et al., 2021)

The success of new product development requires analytical application and coordination of procedures, approaches, and activities based on the changing market, technological, and competition. In new product development, an existing product is transformed based on the alteration of certain product features and refinement of ideas to create new varieties based on the firm's product development strategy (Eshiett & Eshiett, 2022).

Hence, through new product development, customer value is prioritized for satisfaction and to increase profitability for the firm. As the marketplace evolved, firms' commitment to new product development is an avenue for productivity and growth (Kotler et al., 2018). This is because technologies play the strategic function of converting creative product ideas for customer consumption. Therefore, the continuous practice of providing product with quality has strong appeal to customers' needs and satisfaction

Methodology

The cross-sectional study on educational diversity and product innovation was carried out at Niger Mills Company Limited and Combination Industry EPZ Calabar with a total population of 481, covering administrative, operational, and contract staff. A sample size of 215 which was determined using the Taro Yamane sampling formula. A descriptive research design was used to explore the data. The random sampling method was used to select the sample for the study. A structured questionnaire was used to facilitate data collection. With the administered questionnaire, 185 copies were retrieved, with a response rate of 86 percent. The data collected

were analyzed using descriptive and multicollinearity tests to assess the adequacy of the data, while multiple regression analysis was employed to test the hypotheses. The validity of the research instrument was obtained through the use of content and face validity, while Cronbach Alpha Coefficient was used to ascertain the reliability. For instance, the instrument was found reliable and fit for the collection of data as shown below:

TABLE 1
Coefficient reliability with Cronbach's Alpha

S/n	Variables	No. of items	Reliability
1	Knowledge sharing diversity	5	0.752
2	Continuous learning diversity	5	0.861
3	Educational attainment diversity	5	0.742
4	Product development	5	0.873

Source: SPSS analysis (2026)

The hypotheses were tested with the use multiple regression analysis as shown below: The model for this study is specified as:

$$PD = f(ED) \dots \dots \dots (i)$$

$$PD = f(KSD, CLD, EAD) \dots \dots \dots (ii)$$

The econometric forms of the models are as follows:

$$PD = \beta_0 + \beta_1 KSD + \beta_2 CLD + \beta_3 EAD \dots \dots \dots (iii)$$

Where $\beta_1, \beta_2, \dots, \beta_4 \neq 0$ are regression coefficients.

PD = Product Innovation

KSD₁ = Knowledge Sharing Diversity

CLD₂ = Continuous Learning Diversity

EAD₃ = Educational Attainment Diversity

ε = error

β_0 = slope

α = Constant

Descriptive Statistics of Variables of the Study

Table 2

Educational diversity and product innovation in manufacturing firms in Calabar

Items	N	Mean	Std. Deviation	Variance
Knowledge sharing diversity	185	3.75	.754	.561
Continuous learning diversity	185	3.62	.651	.630
Educational attainment diversity	185	3.59	.842	.569
Product innovation	185	4.21	.776	.783

Source: Author's analysis, 2026

The above descriptive statistics on educational diversity and product innovation covered knowledge sharing diversity, continuous learning diversity, and educational attainment diversity, and product innovation based on the mean, standard deviation, and variance shown below:

Descriptive analysis of knowledge sharing diversity:

Knowledge sharing diversity was measured based on the fact that knowledge sharing improves operational efficiency, problem-solving, and driving innovation; through knowledge sharing, faults in the assembly line are quickly solved to enhance productivity; cross-training bridges skill gaps when knowledge sharing is implemented between senior experts and new staff; and

knowledge sharing helps firms to adjust to new market trends and technology updates. Hence, with a mean of 3.75, the construct shows that all the questions received positive responses. With a standard deviation that is less than 1, it shows that 76 percent of the variance was derived from the mean. This justifies the adequacy in the spread of the data

Descriptive analysis of continuous learning diversity:

Continuous learning diversity was measured based on the fact that the diversity in continuous learning allows work teams to solve floor-level problems quickly and adjust to effective use of new automated tools; the diversity in cross-training allows work teams to handle multiple production roles, which reduces production bottlenecks; different educational backgrounds offer different ideas that minimize machine downtime; and continuous learning helps to upskill workers to handle advanced lean manufacturing without errors to enhance productivity. Hence, with a mean of 3.62, the construct shows that all the questions received positive responses. With a standard deviation that is less than 1, it shows that 76 percent of the variance was derived from the mean. This justifies the adequacy in the spread of the data

Descriptive analysis of educational attainment diversity:

Educational attainment diversity was measured based on the fact that higher innovation through educational attainment helps to create new products with ideas; workers with academic degrees and technical training are combined to bring a set of skills that fix factory issues; teams handle complex tasks more efficiently through diverse knowledge pools; and educational attainment diversity improves product creativity, boosts innovation, and increases problem-solving capabilities. Hence, with a mean of 3.59, the construct shows that all the questions received positive responses. With a standard deviation that is less than 1, it shows that 76 percent of the variance was derived from the mean. This justifies the adequacy in the spread of the data

Descriptive analysis of sustainable business performance

Product innovation was measured based on the fact that higher innovation through educational attainment helps to create new products with ideas; workers with academic degrees and technical training are combined to bring a set of skills that fix factory issues; teams handle complex tasks more efficiently through diverse knowledge pools; and educational attainment diversity improves product creativity, boosts innovation, and increases problem-solving capabilities. Hence, with a mean of 4.21, the construct shows that all the questions received positive responses. With a standard deviation that is higher than 1, it shows that 95 percent of the variance was derived from the mean. This justifies the adequacy in the spread of the data

Multicollinearity Test

Table 3

Table showing Multicollinearity Test result

Variables	Tolerance	Collinearity Statistic VIF
Knowledge sharing diversity	.855	1.342
Continuous learning diversity	.727	1.484
Educational attainment diversity	.767	1.545

Source: SPSS Analysis 2026

The strength and correlation of the study variables that are predictors were ascertained with the use of multicollinearity test. Based on this, a tolerance inflation factor (VIF) was adopted to affirm the variation of the variables that is unexplained among other factors. Hence, with multicollinearity of 0, it implies that there is an existence of overestimation of the regression

coefficient. Based on this, the tolerance is not expected to be lower than 0.1, and the VIF is also not expected to be higher than 5. Hence, the table above shows that the value of tolerance is higher than 0.1 while the permissible value is less than 5 for VIF.

Test of Hypotheses

Table 4

Multiple regression results on the effect of green management practices on the sustainable business performance of a manufacturing firm in Calabar

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.811 ^a	.657	.624	.354

a. Predictors: (Constant), GP, GT, GWM

b. Dependent Variable: SBP

Source: SPSS output, 2025

Table 5

Analysis of variance (ANOVA) on the effect of green management practices on the sustainable business performance of a manufacturing firm in Calabar

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2167.964	3	22.453	184.873	.000 ^b
	Residual	56.975	182	5.86		
	Total	2224.939	185			

a. Dependent Variable: SBP

b. Predictors: (Constant), GP, GT, GWM

Source: SPSS output, 2025

Table 6

Coefficients on the effect of green management practices on the sustainable business performance of a manufacturing firm in Calabar

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	T	Sig.
1	(Constant)	-.862	.246		-3.683	.001
	GP	.632	.057	.672	18.636	.000
	GT	.519	.063	.661	13.667	.004
	GWM	.674	.071	.642	9.781	.000

a. Dependent Variable: SBP

Source: SPSS output, 2026

Hypothesis one

H₀: Knowledge sharing diversity does not significantly affect new product development in manufacturing firms in Calabar, Cross River State

H₁: Knowledge sharing diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State

Decision:

The multiple regression results in Table 4 revealed an R value of .811, R-square of .657, and adjusted R-square of .624. All the estimates indicated the goodness of fit of the data to the model. Table 8 shows the F-test (184.873, $p < 0.05$) that the overall prediction of the independent variable on the dependent variable is statistically significant; therefore, the regression model provides sufficient evidence to conclude that knowledge sharing diversity affects new product development in manufacturing firms. The regression coefficient in Table 5 provides information as to how knowledge sharing diversity affect new product development in manufacturing firms. The “sig” column in the table reveals that the “P” value is less than 0.05, which means that the independent variable is statistically significant. The result shows that knowledge sharing diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State (Beta = 0.672, $P < 0.05$). Therefore, the null hypothesis was rejected.

Hypothesis two

H₀: Continuous learning diversity does not significantly affect new product development in manufacturing firms in Calabar, Cross River State

H₁: Continuous learning diversity significantly affect new product development in manufacturing firms in Calabar, Cross River State

Decision:

The multiple regression results in Table 4 revealed an R value of .811, R-square of .657, and adjusted R-square of .624. All the estimates indicated the goodness of fit of the data to the model. Table 8 shows the F-test (184.873, $p < 0.05$) that the overall prediction of the independent variable on the dependent variable is statistically significant; therefore, the regression model provides sufficient evidence to conclude that continuous learning diversity affects new product development in manufacturing firms. The regression coefficient in Table 5 provides information as to how continuous learning diversity affects new product development in manufacturing firms. The “sig” column in the table reveals that the “P” value is less than 0.05, which means that the independent variable is statistically significant. The result shows that continuous learning diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State (Beta = 0.661, $P < 0.05$). Therefore, the null hypothesis was rejected.

Hypothesis three

H₀: Educational attainment diversity does not significantly affect new product development in manufacturing firms in Calabar, Cross River State

H₁: Educational attainment diversity significantly affect new product development in manufacturing firms in Calabar, Cross River State

Decision:

The multiple regression results in Table 4 revealed an R value of .811, R-square of .657, and adjusted R-square of .624. All the estimates indicated the goodness of fit of the data to the model. Table 8 shows the F-test (184.873, $p < 0.05$) that the overall prediction of the independent variable on the dependent variable is statistically significant; therefore, the regression model provides sufficient evidence to conclude that educational attainment diversity affects new product development in manufacturing firms. The regression coefficient in Table 5 provides information as to how knowledge educational attainment diversity affect new product development in manufacturing firms. The “sig” column in the table reveals that the “P” value is less than 0.05, which means that the independent variable is statistically significant. The

result shows that educational attainment diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State (Beta = 0.672, $P < 0.05$). Therefore, the null hypothesis was rejected.

Discussion of findings

The finding on the first hypothesis reveals that knowledge sharing diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State (Beta = 0.672, $P < 0.05$). In consensus, Garcia-Perez et al. (2020) stressed that knowledge sharing diversity allows knowledge to be generated through the collection of existing and appropriate information to expand knowledge. This is confirmed with a positive outcome of the descriptive statistics with a mean of 3.75 on the effect of knowledge sharing diversity in new product development. This is a fact because knowledge sharing allows knowledge to be generated through the collection of existing and appropriate information to expand knowledge. Hence, in the studied manufacturing firm, knowledge sharing improves operational efficiency, problem-solving, and driving innovation; through knowledge sharing, faults in the assembly line are quickly solved to enhance productivity; cross-training bridges skill gaps when knowledge sharing is implemented between senior experts and new staff; and knowledge sharing helps firms to adjust to new market trends and technology updates. The finding implies knowledge sharing combines expertise and skills in driving product development to build and solve problems affecting product launch. This aligns with the work of Akhtar et al. (2022)

The finding on the second hypothesis reveals that continuous learning diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State (Beta = 0.661, $P < 0.05$). In line with this finding, (Rajabalee et al. (2022) stressed that the practice of continuous learning diversity relates to a commitment to build knowledge, skills, and inclusive behaviour of people from diverse perspectives, backgrounds, and cognitive styles. This is confirmed with a positive outcome of the descriptive statistics with a mean of 3.75 on the effect of continuous learning diversity on new product development. This is true because continuous learning diversity harnesses personal growth, human experience, and learning methods to ensure the organization achieves its set goals. In the studied manufacturing firm, diversity in continuous learning allows work teams to solve floor-level problems quickly and adjust to effective use of new automated tools; the diversity in cross-training allows work teams to handle multiple production roles, which reduces production bottlenecks; different educational backgrounds offer different ideas that minimize machine downtime; and continuous learning helps to upskill workers to handle advanced lean manufacturing without errors to enhance productivity. Hence, the finding implies that continuous learning sparks creativity, accelerates the firm's adaptation to market shifts and improve problem solving to achieve new product development. This affirms the work of Zhang et al (2022)

The finding on the third hypothesis revealed that educational attainment diversity significantly affects new product development in manufacturing firms in Calabar, Cross River State (Beta = 0.672, $P < 0.05$). In line with this finding, Sharma et al. (2023) stressed that educational attainment diversity ensures that the workforce builds the required cross-cultural skills, has fair access and support for inclusive growth. This is confirmed with a positive outcome of the descriptive statistics with a mean of 3.59 on the effect of educational attainment diversity on new product development. This is a fact because the importance of innovation and creativity through educational attainment ensures that teams with various educational backgrounds harness their financial insight, technical and marketing skills to explore new product development. In the studied manufacturing, higher innovation through educational attainment helps to create new products with ideas; workers with academic degrees and technical training are combined to bring a set of skills that fix factory issues; teams handle complex tasks more efficiently through diverse knowledge pools; and educational attainment diversity improves

product creativity, boosts innovation, and increases problem-solving capabilities. The finding implies that the mix of various academic fields enhances product development, overcomes technical challenges, accelerates innovative design, and broadens collective knowledge. This justifies the work of Hanushek and Woessmann (2022)

Conclusion and recommendation

The combination of vocational expertise, business and technical skills enhances the operational growth of manufacturing firms. The study reviewed the need the effect of knowledge sharing diversity, continuous learning diversity, and educational attainment diversity on new product development in manufacturing firms. Hence, the implementation of educational diversity has enhanced problem-solving, improved decision-making, and enhanced innovativeness in teamwork. The mix of various academic backgrounds has helped workgroups to handle complex challenges through the combination of theoretical knowledge and practical skills. A rich knowledge base requires formal training to ensure technical challenges are resolved through the combination of specialized knowledge so that firms can scale operations effectively and efficiently, and adapt to market changes. Based on the findings, the study recommended the following:

1. The HR manager should continuously design policies that promote knowledge sharing to drive product development through the combination of expertise and skills to build and solve problems that affect product launch.
2. The HR manager should prioritize continuous learning to spark creativity, accelerate the firm's adaptation to market shifts, and improve problem-solving to achieve new product development.
3. The HR manager should commit to educational attainment diversity to have a mix of various academic fields to enhance product development, overcome technical challenges, accelerate innovative design, and broaden collective knowledge.

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