



Business Transformation and the Performance of Manufacturing Firms in Nigeria

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ABSTRACT

The business atmosphere is increasingly becoming competitive due to the reality of global dynamics. Thus, firms especially, the manufacturing sub-sector need to adopt transformation strategies to enable them compete favorably. This study titled Business transformation and Performance of the Manufacturing Firms in Nigeria is written to examine the effect of business transformation on performance of manufacturing sub-sector in North-Central Nigeria. The population of the study was 1404 spread across the selected manufacturing firms in Nigeria. However, due to the fact that the population is large the researcher utilized the Godden sample size statistical technique to reach 302 respondents, however, only 284 respondents completed and returned their questionnaire which shows a retrieval rate of 94%. More so, the study applied research survey design, and the statistical tools applied comprised descriptive and parametric statistics. More so, the hypothesis was tested using simple linear regression analysis. The findings revealed that there is a significant positive relationship between Technological Resource application and First Pass Yield ($r = .939$, $p\text{-value} < 0.05$). In view of the finding, the study concluded that there is a significant positive relationship between Business transformation and Performance of manufacturing firms in Nigeria. Anchored on the finding the study recommends that a Business Transformation techniques should be improved and periodic review be carried out in order to sustain and improve performance.

INTRODUCTION

Performance of business is greatly anchored on how innovative techniques are applied through information technology. Though, the basic principles of business are relevant to all kinds of enterprises, peculiarity of business environment differs. Adegbe and Adiniji (2017), Afolabi and Lasiende (2019) revealed that the output from the manufacturing has great effects on nation's overall output. More so, the application of technological resources to enhance business performance is becoming more pronounced across the globe.

Thus, the application of innovativeness in businesses and knowledge economy is at the core in this era of globalization (Malik & Audu, 2023, Kehinde, 2024). Therefore, developed nations as well as the developing economies have consistently strived to enhance the performance of manufacturing through the instrumentality of innovative techniques. To this end, developed nations such as Canada, Japan, United States of America, China and other developing nations like Ghana, Nigeria and Cameroun and so on have consistently strived to enhance the manufacturing sectors to meet the nation's economic needs (Uchenna, Audu 2021 & Uchenna, Audu, 2022). The manufacturing sub-sector has been widely acknowledged as a catalyst for socio - economic growth and development globally. Manufacturing firms have experienced poor performance. Particularly, West Africa ceramics limited, BN Ceramics and Royal ceramics have experienced weak customers' loyalty which seems to be connected to production of their products that do not meet customers' perceived expectations. Again, over-dependence on foreign human capital by selected firms seems to discourage employees thereby adversely affecting performance. Apart from these factors which the firms faced in North-central the challenges of weak maximization of production capacity still persist thereby leading to high production cost as well as reduced revenue, this is also amidst the persistent high exchange rate due to over-dependence on other foreign technologies. In addition, the challenges of quality control exist in these companies' which seems to be as a result of crude techniques in certain aspects of production while public perception of locally made goods is another major constraint.

Though, there have been several steps in the past by Nigeria government in tackling these identified challenges. For example, government through the standard organization of Nigeria has made an effort in the past to ensure products being produced in Nigeria meets specific quality standard. Government has also made several regulations to ensure that employees in Nigeria who are well fit for tasks are engaged rather than hiring foreign expertise. Again, the federal government of Nigeria had in the past tried to enlighten the public through the National orientation agency on the public perception of locally made goods while it also reduced its bureaucracy to enable these firms' access funds to improve its production capacity.

But, despite all these attempts by the Nigerian government, the challenges facing manufacturing industry in Nigeria seem not to be fully addressed. Though, there have been several studies such as Okonkwo (2014), Kunle (2015), Agu and Anichebe (2016), Omale and Oriaku (2017), Yananda *et*

al (2022) and Albert et al, 2021 to demystify the causes of these challenges towards ensuring that manufacturing firms in Nigeria becomes more productive. But, these identified practical challenges are still evident in these studied companies. The persistence of these challenges could be as a result of geographical differences as most of the studies conducted do not specifically focused on North-central. Though, some of these researchers Nzewi et al (2015) Orogbu et al (2015), Edna and Samson (2021) and Ndirangu et al (2017) and Wardhanie and Amelia (2022) deduced that the challenges of poor performance could be tackled using transformational techniques known as Business transformation but these studies were conducted in different environment and the timeframe also differs thereby, its application by these firms have not strive effectively.

The manufacturing firms in North-Central the region of Nigeria seem not to have strived successfully considering the economic terrain where the purchasing power of the people residing in this area is relatively low. The people in this area are either at the middle or low economic social class. In addition, the social perception of the people where the majority is civil servants makes them inaccessible to the luxurious lifestyle thereby affecting the performance of manufacturing firms in the area. In addition, the abandonment of the gigantic Ajaokuta steel company limited located in the North-Central makes investment in manufacturing sector in this area unattractive to other investors as the steel company would have facilitates activities of other firms within the area. Performance of manufacturing firms is seen as the output generated through manufacturing activities as well as systematic steps of not producing products or rendering services, but ensuring that such are well delivered to the customers profitably. Therefore, the performance of manufacturing firms is measured with first pass yield.

Alzoubi and Khafajy (2015), Muhaman, Lyvia and Arif (2022) argued that the technique of Business transformation should be able to appraise, revise and enhance firms' operations towards meeting their immediate and strategic aspirations (Waidi, 2014; Nzewi et al 2015; Orogbu et al 2015; Ndirangu et al 2017; Norlena et al (2017), Omale & Oriaku 2017 & Aysar,. 2019). On this note, there is a need to evaluate the extent to which Business transformation has been able to enhance firms' performance in the North - Central Nigeria. From the foregoing, this study sought to identify and establish a significance relationship if any between the independent variable, Business transformation and dependent variable, Performance of firms in North-Central Nigeria. The business transformation is measured with technological resource application otherwise known as information technology (IT) infrastructure which is the independent variable whereas the dependent variable performance also measured with first pass yield.

LITERATURE REVIEW

Technological Resource Application (IT Infrastructure)

Technology refers to the application of techniques or tools that facilitate production process (Asare & Emmanuel, 2018). Technology is also seen as a fundamental aspect of business transformation processes. Businesses across the globe ranges from the service oriented firms to the manufacturing companies have delved into the aggressive application of technological resource application such as machines, equipment and other tools that facilitate production of products or rendering of services. These resources apart from improving their outputs and meeting customers' satisfaction also proved to be more economical in terms of production costs since the application of technological resource will be able to create efficiency, waste minimization and production of large quantities leading to the economics of scale.

Therefore, on the basis of transforming business with the application of technological resource Laura et al, (2018), Ibrahim (2024), Zanyar (2024) and Baber et al, (2024) suggested the following principles, that there is a linkage of parallel tasks rather than integrating their output, information should be sourced and captured from the central point and there should be holistic information technologies, there should be dispersed geographically or according to departments to enable it meet peculiar tasks, there should be a control process and such reviewed periodically and firm should put up organizing techniques based on outcome but not tasks. Hence, technological resource application as a business process reengineering technique is centered on cost minimization concept thereby leading to a relative reduction of operational cost. Thus, through the application of business process reengineering technique of technological resource application, the firm exhibits high level of automation, information and communication technology, management support system through which the management carries out planning and controls its technology (Kehinde, 2024 & Baber et al, 2024). Therefore, the instrumentality of technological resource application as BPR technique leads to moderate or low production costs for the customers.

First Pass Yield

The first pass yield: The first pass yield is seen as the amount of products coming out of a process over the number of units enshrined in such over a particular period of time. Andre (2021) revealed that the first pass yield is the amount of quality of process which reflects the rate of products produced accurately without any form of rework or corrective activities. Again, the first pass yield is a critical consideration in measuring the performance of manufacturing firms first pass yield across the globe. Thus, the first pass yield leads to reduction of rejection, reduction of internal scrap, avoidance of product repairs, reducing the possibility of reoccurrence as well as the capability of reducing non- value added activities. Additionally, Claudia and Chris (2015) argued that first pass yield is a test of quality of equipment, personnel, process and methods. Thus, the efficacy of production activities is largely relied on the first pass yield.

Patmanaben *et al* (2019) noted that first pass yield enables firms to identify and address potential areas of threats thereby leading to reduction in defect rate during manufacturing of products. Therefore, this implies that first pass yield is a fundamental performance indicator which portrays firm product quality and efficient production. Patmanaben *et al* (2019) argued that first pass yield is seen as an indicator which gauges the production and performance of manufacturing firms that defines the performance based on number of efficient versus defective amount of goods produced. Therefore, first pass yield entails an appraisal of firm consistent improvement effort. Again, the fundamental philosophy is based on the fact that first pass yield is anchored on attaining reduced costs of scrap as well as rework scrap targeted at improved efficiency and customers satisfaction. Furthermore, the first pass yield is measured with the amount of products produced by a manufacturing procedure without any form of rework over the total amount of units which went into such input within a specified number of time and percentages.

Andre (2021) also argued that the best practice to attain first pass yield in the manufacturing process include prevention and maintenance of equipment carried out regularly, utilization of high quality raw material with the view to minimizing defective as well as a well articulated trained manufacturing programmes targeted at attaining an efficient production. Therefore, the technique in calculating first pass yield is amount of unit produced over the total of goods going into production multiply by a hundred percent.

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Theoretical Framework

Game Theory

The game theory as postulated by Ugwu (2006), contended that the relationship between employer and employees is centred on game situation with common attribute of interdependence. Therefore, the game theory noted that every player in a game which in this situation is the employers, customers, employees and other stakeholders adopted the strategic technique of winning the competition between business process reengineering which strives innovation and performance. More so, game theory is seen as the science of logical strategies towards maximizing individual or institutional output as designed towards creating favourable inducement that strategizes in improving employees' retention. Thus, game theory applicably relied on competitive choices and situations. Consequently, the action and inaction of the employers as well as the employees largely depends on effective trade - off between their input and resources which translates on how employers pursue their' input without considering the extent of employees' motivation. This theory is relevant to the research because of its practical application.

Empirical Studies

The study titled the moderating effect of Information Technology (IT) capability on the relationship between business process reengineering factors and organizational performance in Bank was conducted to examine the moderating effects of information technology capability on the relationship between business process reengineering factors and organizational performance of Nigerian banks. The study adopted a survey research design and finding shows that IT capability moderated the relationship between BPR factors and organizational performance. This study was conducted to cover commercial banks while the current study covers the manufacturing firms which may have its own peculiarities. The study was conducted in (2012) by Kabiru et al.

Schuh et al conducted a study on Business Transformation in the manufacturing industry, how information acquisition, analysis, usage and distribution affect the success of lifecycle-product-service systems. The study which was conducted in Germany focuses on addressing the cause effect relationship between information gatherings over product-service life cycle. The study adopted a qualitative approach and targeted at designing a workable model towards integrating manufacturing innovative capacity with service excellence. Though, this study is relevant to the current research being conducted but the environmental climate of Germany where the study was carried out is quite different from Nigeria. Again, the period in which the

research was conducted (2015) cannot be relied on thus, the need for the current study.

Asare and Emmanuel conducted a study in 2018 on the Impact of IT-Technological innovation on the productivity of banks employee to examine the impact of IT-technological innovation on employees' performance in the banking sector. The study collected data through the primary sources while structured questionnaire were distributed to respondents who were employees of the banks. The data were analyzed using chi-square statistical tool and correlation analysis. The research revealed that IT-technological innovation affects employees' productivity.

Purnamasari et al conducted a study in 2020 on the factors affecting the use of online application for business process reengineering acceleration in micro, small and medium enterprises as a consequence of covid-19 pandemic. The research was aimed at examining the factors that influences utilization of online application for the acceleration of BPR. The study adopted a descriptive research design and it revealed that personal factors do not affect the use of online application as well as the Organizational factors.

More so, Igor et al conducted a research in 2021 on Improving Business Process Efficiency and Quality by using Business process model system with the objective of examining how business process efficiency and quality can be attained with the instrumentality of the business process modeling system. The research adopted descriptive research design and the instrument used to elicit data from respondents was a structured questionnaire. The research revealed that the constraints of low productivity being experienced by the firms were connected to low application of IT infrastructure. The research examined several nations across Europe, Asia, America and Africa and the findings could be too broad to be adapted to a single nation and sector in particular considering the socio-cultural climate. In addition, this the study distilled the independent variable with IT infrastructure while the measurement of the variable of interest (dependent variable) was measured with return on investment thus, the measurement of these variables seems too narrow to holistically suggest that the findings should be relied upon and such could amount to over-generalization. To this end, the current study intends to fill the identified by exploring all segments of organizational resources such as personnel, human and material resources and structure so that the findings could be more justified.

In addition, Jan et-al in 2021 carried out a study on Pluralism and Pragmatism in the Information systems Field: The case of Research on Business Process and Organizational Routines. The aim of the research was to critically examine how the application of information system enhances business process reengineering. The researchers adopted content analysis and its findings revealed that effective implementation of the business process reengineering could be achieved through the information systems. The research although relevant, but focuses more on information systems which is just an aspect of the business process reengineering tools. For example, no matter how robust an information system is, it cannot be effectively utilized in the absence of a well

motivated workforce, organizational atmosphere as well as a well articulated organizational structure. To this end, this research is aimed at filling the identified gap by exploring these salient areas in the course of the research.

METHODOLOGY

The research utilized a descriptive research survey design. The research method is a survey method which involves surveying the respondents aimed at eliciting responses for the making statistical inference. Thus, the research which examines business transformation and the performance of manufacturing companies involved collecting relevant data through the primary sources. The primary data gathered using a structured questionnaire and the data were subjected to both descriptive and parametric statistical analysis. The study population comprised the entire workforce in the selected manufacturing companies in Nigeria which is 1404. But, due to the fact that the population of the study cannot be effectively managed, the researcher utilized the Godden' statistical formula.

RESEARCH RESULT AND DISCUSSION

Table 1 Descriptive Statistics on IT Infrastructure

	IT Infrastructure	SA 5	A 4	U 3	D 2	SD 1	Mean	Standard Deviation
1.	My employer encourages me to use computer devices in performing my tasks.	101 (35.4%)	53 (18.6%)	53 (18.6%)	44 (15.4%)	33 (11.6%)	3.51	1.41
2.	Most of the tasks are facilitated with the aid of technological devices.	113 (39.6%)	43 (15.1%)	55 (19.3%)	50 (17.5%)	23 (8.1%)	3.61	1.37

3.	There is free flow of communication within the organization using telephone.	64 (22.5%)	39 (13.7%)	54 (18.9%)	63 (22.1%)	64 (22.5%)	2.92	1.47
4.	Most decisions taken by my employers are first subjected to computer software application.	47 (16.5%)	51 (17.9%)	28 (9.8%)	99 (34.7%)	59 (20.7%)	2.75	1.40
5.	My employer provides adequate computers and other devices to make my tasks easy.	68 (23.9%)	57 (20%)	5 (1.8%)	80 (28.1%)	74 (26%)	2.88	1.57
Average mean/SD							3.13	1.44

Source: Research Survey, 2024

Table 1 shows the responses on the likert scale questions, mean and standard deviation. The question on whether employers encourage the employees to use computer devices in performing their tasks., 101 respondents (35.4%) strongly agreed, 53 respondents (18.6%) agreed, 53 respondents (18.6%) were undecided, 44 respondents (15.4%) disagreed while 33 respondents (11.6%) strongly disagreed. The mean value of 3.51 and standard deviation 1.14 > 3.00 which means that most of the respondents agreed. For the questions on whether most of the tasks are facilitated with the aid of technological devices, 113 respondents (39.6%) strongly agreed, 43 respondents (15.1%) agreed, 55 respondents (19.3%) were undecided, 50 respondents (17.5%) disagreed while 23 respondents (8.1%) strongly disagreed. The mean value is 3.61 and standard deviation 1.37 > 3.00 showing that most of the respondents agreed.

In addition, the question on whether there is free flow of communication within the organization using telephone, 64 respondents (22.5%) strongly agreed, 39 respondents (13.7%) agreed, 54 respondents (18.9%) were undecided, 63 respondents (22.1%) disagreed while 64 respondents (22.5%) strongly

disagreed. The mean value of 2.92 and standard deviation $1.47 < 3.00$ indicating that most of the respondents disagreed.

More so, for question on whether most decisions taken by the employers were first subjected to computer software application, 47 respondents (16.5%) strongly agreed, 51 respondents (17.9%) agreed, 28 respondents (9.8%) were undecided, 99 respondents (34.7%) disagreed while 59 respondents (20.7%) strongly disagreed. Therefore with the mean value of 2.75 and standard deviation of 1.40 which is < 3.00 it means that most of the respondents disagreed.

For the question on whether the employers provide adequate computers and other devices to make my tasks easy, 68 respondents (23.9%) strongly agreed, 57 respondents (20%) agreed, 5 respondents (1.8%) were undecided, 80 respondents (28.1%) disagreed while 74 respondents (26%) strongly disagreed. The mean value of 2.88 and standard deviation $1.57 < 3.00$ indicating that most of the respondents disagreed.

Finally the average mean value of 3.13 and standard deviation $1.44 > 3.00$ indicating acceptance of the overall response on IT infrastructure.

Table 2 Descriptive Statistics on First Pass Yield

	First Pass Yield	SA	A	U	D	SD	Mean	Standard Deviation
		5	4	3	2	1		
6.	I observed that there is reduction of rejection of the products offered to customers.	127 (44.6%)	47 (16.5%)	43 (15.1%)	39 (13.7%)	28 (9.8%)	3.73	1.40
7.	I observed that there is a reduction in internal scrap.	110 (38.6%)	45 (15.8%)	54 (18.9%)	44 (15.4%)	31 (10.9%)	3.56	1.41
8.	I observed that the repairs are avoided as much as possible during production process.	116 (40.7%)	33 (11.6%)	60 (21.1%)	65 (22.8%)	10 (3.5%)	3.63	1.31

9	There is reduction of possibility in reoccurrence of faults.	25 (8.8%)	25 (8.8%)	49 (17.2%)	97 (34%)	88 (30.9%)	2.30	1.24
5.	My employer ensures that there is less likelihood of unrelated activities during production process.	159 (55.8%)	55 (19.3%)	34 (11.9%)	4 (1.4%)	32 (11.2%)	4.07	1.32
Average mean/SD							3.46	1.34

Source: Research Survey, 2024

Table 2. indicates the responses on the likert scale questions, mean and standard deviation. For the question on whether there is rejection of the products offered to customers, 127 respondents (44.6%) strongly agreed, 47 respondents (16.5%) agreed, 43 respondents (15.1%) were undecided, 39 respondents (13.7%) disagreed while 28 respondents (9.8%) strongly disagreed. The mean value of 3.73 and standard deviation 1.40 > 3.00 which means that most of the respondents agreed.

For question on whether there is a reduction in internal scrap, 110 respondents (38.6%) strongly agreed, 45 respondents (15.8%) agreed, 54 respondents (18.9%) were undecided, 44 respondents (15.4%) disagreed while 31 respondents (10.9%) strongly disagreed. The mean value is 3.56 and standard deviation 1.41 > 3.00 showing that most of the respondents agreed.

For question on whether the repairs are avoided as much as possible during production process, 116 respondents (40.7%) strongly agreed, 33 respondents (11.6%) agreed, 60 respondents (21.1%) were undecided, 65 respondents (22.8%) disagreed while 10 respondents (3.5%) strongly disagreed. The mean value of 3.63 and standard deviation 1.31 > 3.00 indicating that most of the respondents agreed.

In addition, for the question on whether there is reduction of possibility in reoccurrence of faults, 25 respondents (8.8%) strongly agreed, 25 respondents (8.8%) agreed, 49 respondents (17.2%) were undecided, 97 respondents (34%) disagreed while 88 respondents (30.9%) strongly disagreed. Therefore with the mean value of 2.30 and standard deviation of 1.24 which is <3.00 it means that most of the respondents disagreed.

For the question on whether employer ensures that there is less likelihood of unrelated activities during production process, 159 respondents

(55.8%) strongly agreed, 55 respondents (19.3%) agreed, 34 respondents (11.9%) were undecided, 4 respondents (1.4%) disagreed while 32 respondents (11.2%) strongly disagreed. The mean value of 4.07 and the standard deviation 1.32 > 3.00 indicating that most of the respondents agreed.

Finally, the average mean value of 3.46 and standard deviation 1.34 > 3.00 indicate acceptance of the overall response on the first pass yield.

Test of Hypothesis

H₀: There is no significant relationship between Technological Resource application and first pass yield.

Table 3. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.939 ^a	.882	.890	.75062	.146

a. Predictors: (constant), technological resource application

b. Dependent variable: the first pass yield

The table 3 reports the level of relationship between the independent and dependent variable. The result of R stood at 0.939 indicating a strong positive relationship between the dependent variable the first pass yield and the explanatory variable technological resource application. The coefficient of multiple determinations R² measures the percentage of the total change in the dependent variable that can be explained by the independent or explanatory variable, the result of Durbin Watson test shows .146 therefore it shows that there is no auto correlation.

Table 4. ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4321.100	1	4321.100	6912.774	.000 ^b
	Residual	176.900	283	.625		
	Total	4498.000	284			

a. Dependent variable: the first pass yield

b. Predictors: (constant), technological resource application

The table shows the results of model summary, and the analysis of the result shows that F = 6912.774 which is significant at (0.000) < 0.05. To this end, since the P-value < 0.05 (critical value), the null hypothesis that there is no significant relationship between Technological resource application and the first pass yield is rejected.

Table 5. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.750	.119		6.324	.000
	Technological resource application	.848	.031	.849	27.039	.000

a. Dependent Variable: first pass yield

The coefficient gives reliable information on how the explanatory variable (the estimated coefficient or beta) affects the dependent variable. The result revealed that the regression constant is 0.750 giving a predictive value of the dependent variable when all other variables are zero. The coefficient of technological resource application is .848 with p-value of 0.000 less than (0.05%) critical value. Thus, it can be concluded that the null hypothesis that there is no significant relationship between technological resource application and the first pass yield is rejected.

Table 6. Summary of Regression Results and other Statistics

Regression		Technological Resource Application	Df	F
Coefficient	0.750	0.848	1	6912.774
P. value	0.000	0.000	283	
R	0.939		284	
R ²	0.891			

Source: Research Data analysis, 2024

The *F*-ratio in the table 6. indicated that the variables of Technological Resource Application statistically predict the first pass yield , $F(1, 283) = 6912.774, p < .0005$ (this means that the regression model has a good fit of the data). Additionally, summary of the regression equation (model formulated) and the result reveals that *R* is 0.939 which is almost 1.00 implying that it is useful for making predictions. The goodness of fit also shows that it has a good fit of *R* with 94% and *R*² of 89% meaning that total variations in Technological Resource application is explained by variations in first pass yield. To this end, all the estimated parameters targeted at predicting the value of the first pass

yield outside Technological Resource application is 6% (i.e, 100- 94) which could be adduced to be statistically insignificant. Hence, this means that the independent variable (Technological Resource application) largely contributes to the prediction of the dependent variable of about 94% with p- value of 0.000 which is less than 0, 05 supporting the notion that there is a significant positive relationship between the dependent and independent variables.

This study revealed that the firms adopt information communication infrastructure in their operations and this has been able to enhance their performances. These findings conform to the Game theory which stands to regulate the fundamental principles toward the improving individual performance which has cumulative effects on the organizational performance. Again, the outcome in the tested hypothesis revealed the P - value of 0.000 which is less than the level of significance of 0.05 hence, there is significance positive relationship technological resource application and the first pass yield. This finding is consistent with the findings of Jan etal (2021) whose findings showed that there is a significant positive relationship between technological resource applications and the first pass yield. More so, the finding is consistent with the finding of Purnamasari etal (2020) who revealed that that customer satisfaction, effective communication and sound customer management positively correlates with organizational performance but contradicts with the finding of Igor etal (2021) who revealed that marketing innovation has a negative impact on learning and growth performance.

CONCLUSIONS AND RECOMMENDATIONS

Since there is a significant positive relationship between business transformation and performance measured with the first pass yield, the research concluded that there is a significant positive relationship between business transformation and the performance of manufacturing firms in Nigeria. The study recommends that the firms should reinvigorate its technological resources such as computer devices, work automation, Management support system and information and communication technology to meet business transformation projects as this will broadened the opportunity for economic of scale, thereby reducing scrap and wastages during production.

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