

## Effect of gender on performance of food industry in Nigeria

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### Abstract

In many parts of the world, industries are more led by male than their female counterpart, but food industries are usually held by female. A widely accepted view is that female leads more in food industry and performs better than their male counterparts. This study therefore focused on effect of gender on performance of food industry in Nigeria, specifically to analyze total factor productivity (TFP) of food industry; determine factor influencing their productivity; and identify gender with better performance and or leads more in food industries.

Cross sectional data was used, sourced from the World Bank Enterprise Surveys (ES) 2014 and the data set covers food industries. The study included 243 male participants and 29 female participants, with a total of 272 participants. Descriptive statistics, and multiple linear regression was used to analyze the relationship between performance of food industry and gender in Nigeria.

The results revealed that higher employment levels are associated with greater productivity in the food industry 0.889 (0.029). There is no significant relationship between capital investment and sales -0.025 (0.122) and likewise changes in capital investment do not strongly influence sales in the analysis. The mean Total Factor Productivity (TFP) for the male participants was 620.720 (SD=5543.228), while for the female participants, it was 107.860 (SD=569.339). The mean work experience for both genders was similar, with males at 12.216 years (SD=9.449) and females at 11.724 years (SD=9.149) while the mean capacity, representing the potential output, was slightly higher for females (76.138, SD=28.285) compared to males (72.877, SD=27.806).

Based on the significant difference in mean TFP between male and female, the study recommended that policy makers should focus on initiatives that promote gender equality and inclusivity in the food industry. Also, given the wide range of TFP values for female participants, it is essential to invest in training and skill development programs to uplift the productivity of women in the food industry and such programs should target both technical and managerial skills.

**Keywords:** Gender; Food Industry; Total Factor Productivity; World Bank Enterprise Surveys

### 1. Introduction

In a recent review for Sub-Saharan Africa, Campos and Gassier (2017) develop a conceptual framework that illustrates how gender-specific constraints – including contextual factors (legal discrimination, social norms, etc.), endowments (skills, capital and assets, etc.) and preferences (risk, time, etc.) – affect strategic choices (capital and labor inputs, etc.) of male and female entrepreneurs and ultimately outcomes (e.g. gender differences in firm performance). It could be discovered that in many part of the world, industries are more held by male than their female counterpart, but food

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industry are usually held by female, do we then say that male do not head food industry or what is the effect of gender on performance of food industry? A widely accepted view is that female leads more in food industry and performs better than their male counterparts and this has made focus to be on female heading food industry.

This paper focused on how gender difference in leading food industry affects performance of food industry. Female-led ventures can differ in how effectively they acquire resources and efficiently use them for different reasons. According to a social feminist (or preference-based) perspective (Black, 1989; Fischer et al., 1993), female entrepreneurs have different preferences (e.g., preference for sales growth), perceptions, or attitude toward risk (i.e., risk aversion) than male entrepreneurs (Du Rietz & Henrekson, 2000; Langowitz & Minniti, 2007; Robb & Watson, 2012).

Women typically have fewer opportunities than men to lead established corporations, or successful ventures, as senior executives, or owner-managers in various industries (e.g., Matsa & Miller, 2011). Consequently, their ventures could be less productive and less successful because they initially lack the experiential knowledge and skills required to understand how a specific market works, or how to serve specific customer segments; and how to effectively perform strategically important tasks—including formulating appropriate strategies to exploit promising opportunities under uncertain or difficult conditions; and acquiring and optimally allocating resources (including optimally matching workers to tasks) to execute these strategies (Cassar, 2012; Dokko et al., 2009; Flabbi et al., 2019; Shane, 2011; Ucbasaran et al., 2010).

The objectives of this study is to analyze total factor productivity (TFP) of food industry; determine factor influencing the productivity and; identify gender with better performance and or leads more in food industry.

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## 2. Methodology

Quantitative research design was used to examine the effect of gender on performance of food industry in Nigeria. Cross sectional data for this study was sourced from the World Bank Enterprise Surveys (ES) 2014. The data set covers food industry. The study included 243 male participants and 29 female participants, with a total of 272 participants. A female-managed firm is defined as a firm where the top manager is female. Female management was rather focused than ownership.

Descriptive statistics, and multiple linear regression was used to analyze the relationship between performance of food industry (dependent variable) and gender (independent variable) in Nigeria.

### 2.1. Model I

Regression analysis of log of sales against employee, capital and materials was run

$$\log(\text{sales}) = B_0 + \log B_1 \text{Employee} + \log B_2 \text{Material} + \log B_3 \text{Capital} + E$$

where: E=error term

### 2.2. Model II

$$\text{TFP} = B_0 + \log B_1 \text{Male} + \log B_2 \text{Female} + E$$

Where: TFP = Total factor productivity, E = error term

and the analysis considered several factors related to performance by descriptive statistics of the gender against other variables like man experience, capacity, firm age, formal education, and labor cost.

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## 3. Results and Discussions

The regression analysis presented in Table 1.0 shows that there is a strong relationship between the number of employees and sales. Higher employment levels are associated with greater productivity in the food industry 0.889\*\*\* (0.029). There is no significant relationship between capital investment and sales -0.025 (0.122). Changes in capital investment do not strongly influence sales in this analysis. There is a significant positive relationship between materials usage and sales meaning that efficient material utilization is crucial for higher productivity. The model fit statistics indicate that approximately 26.6% of the variability in sales can be explained by the independent variables. The overall regression model is statistically significant.

**3.1. Total factor productivity result**

**Table 1** Regression of log of sales against employee, capital and materials

	<b><i>Dependent variable</i></b>
	log(Sales)
log(Employee + 0.1)	0.889**
	(0.029)
log(Capital + 0.1)	-0.025
	(0.122)
log(Materials + 0.1)	0.171**
	(0.036)
Constant	10.503
	(0.572)
Observations	272
R <sup>2</sup>	0.266
Adjusted R <sup>2</sup>	0.258
Residual Std. Error	2.612 (df = 268)
F Statistic	32.405*** (df = 3; 268)
<i>Note:</i>	p** <0.05 p*** <0.01

Source: Author's Computation, 2023

Table 2.0 shows the impact of gender on the performance of the food industry in Nigeria. The mean Total Factor Productivity (TFP) for the male participants was 620.720 (SD=5543.228), while for the female participants, it was 107.860 (SD=569.339). The overall mean TFP was 566.040 (SD=5243.839). The TFP range for the male participants was 0.002 to 71382.411, and for the female participants, it was 0.050 to 3068.077. The range of Total Factor Productivity (TFP) for the female participants in the study on the impact of gender on the performance of the food industry in Nigeria was 0.050 to 3068.077. This means that the lowest TFP observed among the female participants was 0.050, while the highest TFP recorded was 3068.077. The range provides insight into the variability of TFP values within the female group, indicating the spread of productivity levels among the participants in the study.

**Table 2** The impact of gender on the performance of the food industry in Nigeria

	<b>(Male) (N=243)</b>	<b>(Female) (N=29)</b>	<b>Total (N=272)</b>	<b>p value</b>
<b>TFP</b>				0.620
Mean (SD)	620.720 (5543.228)	107.860 (569.339)	566.040 (5243.839)	
Range	0.002 - 71382.411	0.050 - 3068.077	0.002 - 71382.411	

Source: Author's Computation, 2023

Table 3.0 shows the result of the descriptive statistics. The study examined the effect of gender on the performance of the food industry. The analysis considered several factors related to performance:

**Man\_exp:** The mean work experience for both genders was similar, with males at 12.216 years (SD=9.449) and females at 11.724 years (SD=9.149). The range of work experience was 1.000 to 72.000 for both genders.

**Capacity:** The mean capacity, representing the potential output, was slightly higher for females (76.138, SD=28.285) compared to males (72.877, SD=27.806). The range of capacity was 0.000 to 100.000 for both genders.

Firm age: The mean age of firms for both genders was relatively similar, with males at 17.416 years (SD=12.795) and females at 17.000 years (SD=16.360). The range of firm age was 1.000 to 111.000 for both genders.

Formal: The majority of participants, regardless of gender, were from formal enterprises: 72.0% of males and 58.6% of females. The p-value for this factor was not provided.

Maneduc: There was no significant difference in the educational levels between genders. The distribution of educational attainment was similar across categories, ranging from "None" to "Postgraduate," with no notable disparities.

Lab cost: The average labor cost for males was substantially higher (mean=362,841,535.728, SD=2,416,654,075.554) compared to females (mean=4,278,593.724, SD=18,478,808.990). The range of labor cost varied from 1.000 to 27,645,906,000.000 for both genders.

Where man\_exp = man experience

Capacity = capacity

Firm age = firm age

Maneduc = man education

Lab cost = Labor cost.

**Table 3** The effect of gender against other variables on the performance of the food industry in Nigeria

<b>Descriptive Statistics</b>				
	male (N=243)	female (N=29)	Total (N=272)	p value
<b>man_exp</b>				0.791
Mean (SD)	12.216 (9.449)	11.724 (9.149)	12.164 (9.402)	
Range	1.000 - 72.000	1.000 - 40.000	1.000 - 72.000	
<b>Capacity</b>				0.552
Mean (SD)	72.877 (27.806)	76.138 (28.285)	73.224 (27.823)	
Range	0.000 - 100.000	8.000 - 100.000	0.000 - 100.000	
<b>firm_age</b>				0.873
Mean (SD)	17.416 (12.795)	17.000 (16.360)	17.371 (13.186)	
Range	1.000 - 111.000	1.000 - 82.000	1.000 - 111.000	
<b>Formal</b>				0.135
No	68 (28.0%)	12 (41.4%)	80 (29.4%)	
Yes	175 (72.0%)	17 (58.6%)	192 (70.6%)	
<b>maneduc</b>				0.688
None	5 (2.1%)	2 (6.9%)	7 (2.6%)	
Postgraduate	18 (7.4%)	3 (10.3%)	21 (7.7%)	
Primary	12 (4.9%)	1 (3.4%)	13 (4.8%)	
Secondary	65 (26.7%)	7 (24.1%)	72 (26.5%)	
Undergraduate	119 (49.0%)	14 (48.3%)	133 (48.9%)	
Vocational	24 (9.9%)	2 (6.9%)	26 (9.6%)	

<b>lab_cost</b>				0.426
Mean (SD)	362841535.728 (2416654075.554)	4278593.724 (18478808.990)	324612398.529 (2286389208.478)	
Range	1.000 - 27645906000.000	3.000 - 100000000.000	1.000 - 27645906000.000	

Source: Author's Computation, 2023

**Table 4** The dependent variable was the logarithm of Total Factor Productivity (log (tfp))

	<i>Dependent variable</i>	
	<b>log(tfp)</b>	
	(1)	(2)
fem_leader1	0.130	
	(0.509)	
maneducPostgraduate	0.945	3.176*
	(1.146)	(0.080)
maneducPrimary	-0.761	-0.359
	(1.219)	(2.319)
maneducSecondary	-0.412	1.518
	(1.042)	(1.817)
maneducUndergraduate	0.470	1.388
	(1.021)	(1.866)
maneducVovational	-0.516	2.521
	(1.120)	(2.258)
firm_age	0.012	0.079***
	(0.014)	(0.002)
man_exp	-0.021	-0.023
	(0.018)	(1.054)
Constant	-0.309	-2.660
	(1.357)	(2.163)
Observations	272	29

R <sup>2</sup>	0.048	0.507
Adjusted R <sup>2</sup>	0.019	0.342
Residual Std. Error	2.573 (df = 263)	1.828 (df = 21)
F Statistic	1.655 (df = 8; 263)	3.079** (df = 7; 21)
<i>Note:</i>		
p* < 0.1, p** < 0.05, p*** < 0.01		

Source: Author's Computation, 2023

From table 4 revealed the Ordinary Least Square (OLS), investigating the effect of gender on the productivity of the food industry in Nigeria. The dependent variable was the logarithm of Total Factor Productivity (log (tfp)). The results of the regression analysis are as follows:

### 3.1.1. Model 1:

There is no significant effect of having a female leader (fem\_leader1) on productivity.

Among different levels of male education (maneduc), having a postgraduate education shows a positive and significant effect on productivity (coefficient=0.945, p<0.1).

### 3.1.2. Model 2:

In addition to the previous findings, having primary, secondary, undergraduate, or vocational education does not significantly affect productivity. Firm age (firm age) has a positive and significant effect on productivity (coefficient=0.079, p<0.01). Work experience (man\_exp) does not have a significant effect on productivity.

It's important to note that the adjusted R-squared values indicate that the variables in Model 2 explain 34.2% of the variation in productivity. The asterisks (\*) denote statistical significance, with \*p<0.01, \*\*p<0.05, and \*\*\*p<0.01.

In Model 2, the following variables were not found to be statistically significant in relation to productivity:

**Fem\_leader1:** The variable representing having a female leader did not have a significant effect on productivity. The coefficient for this variable was 0.130, and the p-value was greater than 0.05 (p>0.05). Therefore, the presence of a female leader did not show a significant association with productivity in the food industry in Nigeria.

**ManeducPrimary:** The variable representing primary education level among males did not have a significant effect on productivity. The coefficient for this variable was -0.761, and the p-value was greater than 0.05 (p>0.05). Thus, having a primary education did not show a significant relationship with productivity in the context of the study.

**ManeducSecondary:** The variable representing secondary education level among males was also not found to have a significant effect on productivity. The coefficient for this variable was -0.412, and the p-value was greater than 0.05 (p>0.05). Hence, having a secondary education did not demonstrate a significant association with productivity.

**ManeducUndergraduate:** The variable representing undergraduate education level among males did not show a significant effect on productivity. The coefficient for this variable was 0.470, and the p-value was greater than 0.05 (p>0.05). Therefore, having an undergraduate education did not have a significant relationship with productivity.

**Maneduc Vocational:** The variable representing vocational education level among males was not found to be significant in relation to productivity. The coefficient for this variable was -0.516, and the p-value was greater than 0.05 (p>0.05). Thus, having a vocational education did not show a significant association with productivity in the study.

## 4. Conclusion and Recommendation

The study proposed a gendered resource perspective on the gender-productivity relationship in food industry. Based on the significant difference in mean TFP between male (620.720) female (107.860), policy makers should focus on

initiatives that promote gender equality and inclusivity in the food industry, such as providing equal opportunities for training, career advancement, and access to resources for both genders, and recognize that women often face unique challenges in balancing work and family, therefore, implementation of policies that support work-life balance, such as affordable childcare options and flexible working arrangements should be put in place.

Given the wide range of TFP values for female participants (0.050 to 3068.077), it is essential to invest in training and skill development programs to uplift the productivity of women in the food industry. These programs should target both technical and managerial skills. Likewise, based on the significant difference in mean TFP between male and female, the study also recommended that policy makers should focus on initiatives that promote gender equality and inclusivity in the food industry. Also, given the wide range of TFP values for female participants, it is essential to invest in training and skill development programs to uplift the productivity of women in the food industry. These programs should target both technical and managerial skills.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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## References

- [1] Black, N. (1989). *Social feminism*. Ithaca, NY: Cornell University Press. DOI: <https://doi.org/10.2307/1963541>[Opens in a new window]
- [2] Campos, Francisco and Marine Gassier (2017). "Gender and Enterprise Development in Sub-Saharan Africa. A Review of Constraints and Effective Interventions." Policy Research Working Paper 8239. Washington, DC: World Bank. <http://hdl.handle.net/10986/28858>
- [3] Cassar, G. (2014). Industry and startup experience on entrepreneur forecast performance in new firms. *Journal of Business Venturing*, 29(1), 137-151. <https://doi.org/10.1016/j.jbusvent.2012.10.002>
- [4] Du Rietz, A., & Henrekson, M. (2000). Testing the female underperformance hypothesis. *Small Business Economics*, 14(1), 1-10. <https://ssrn.com/abstract=998259>
- [5] Flabbi, L., Macis, M., Moro, A., & Schivardi, F. (2019). Do female executives make a difference? The impact of female leadership on gender gaps and firm performance. *Economic Journal*, 129(622), 2390-2423. <https://doi.org/10.1093/ej/uez012>
- [6] Ucbasaran, D., Westhead, P., Wright, M., & Flores, M. (2010). The nature of entrepreneurial experience, business failure and comparative optimism. *Journal of Business Venturing*, 25(6), 541-555. <https://doi.org/10.1016/J.JBUSVENT.2009.04.001>