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## Article

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Businesses

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*Suggested Citation:* Adedeji, Funke Tawakalitu; Taiwo, Kehinde; Oyebola, Abiodun Isaac; Oyewole, Oyebisi Olaleye; Kappo-Abidemi, Christiana (2024) : The effect of informal food service operators' capabilities on their performance in Nigeria, *Businesses*, ISSN 2673-7116, MDPI, Basel, Vol. 4, Iss. 4, pp. 812-822,  
<https://doi.org/10.3390/businesses4040044>

This Version is available at:

<https://hdl.handle.net/10419/338767>

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## Article

# The Effect of Informal Food Service Operators' Capabilities on Their Performance in Nigeria

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**Abstract:** Technology has become crucial for businesses of all scales, enhancing operational efficiency, customer experience, and overall performance. While many formal businesses have embraced technology, small and informal businesses, particularly in rural areas, often struggle with adoption due to resource constraints. This study examines the impact of technological capability (TC) on the performance of informal food service operators (IFO) in southwestern Nigeria. This study employed a quantitative approach whereby a closed-ended questionnaire was administered to 180 IFOs across different LGAs in Oyo State to elicit information about the effect of their activities on performance indicators. The response rate was 93.8%. Data was analyzed using a binary logistic regression model. Findings revealed that the innovation capability ( $\beta=-1.657$ ;  $p=0.003^*$ ) and production capability ( $\beta=-3.276$ ;  $p=0.009^*$ ) of the IFOs significantly influenced their sales turnover and profit level is influenced by innovation capability ( $\beta=-1.657$ ;  $p=0.013^*$ ), investment capability ( $\beta=-2.013$ ;  $p=0.004^*$ ) and linkage capability ( $\beta=-2.716$ ;  $p=0.003^*$ ) within the study area. The study recommends that there should be strong linkages between the operators and technology-providing organisations to enhance their innovation capability.

**Keywords:** informal; food service; resource constraints; business performance; linkage; innovation



**Citation:** Adedeji, F.T.; Taiwo, K.; Oyebola, A.I.; Oyewole, O.O.; Kappo-Abidemi, C. The Effect of Informal Food Service Operators' Capabilities on Their Performance in Nigeria. *Businesses* **2024**, *4*, 812–822. <https://doi.org/10.3390/businesses4040044>

Academic Editor: Eric Shiu

Received: 10 June 2024

Revised: 29 September 2024

Accepted: 28 October 2024

Published: 1 December 2024



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## 1. Introduction

Technology has gradually become integral to almost all forms of formal and informal business. Considering the clientele base, most local and international formal businesses have long embraced technology to benefit their operational efficiency, customer service and experience, and overall performance. However, some small and informal businesses are yet to see the need to use new technology to carry out their business or are unsure of the value technology could add to their existing mode of operation. According to [1] greater technological capability (TC) allows businesses to participate in more strategic activities, adopt distinctive resources and abilities, and obtain a competitive edge. This will boost profitability and foster business growth. However, most small businesses lack the needed resources to adopt relevant technology, especially informal businesses owned by individuals with limited resources. Guerra and Camargo [2] further explained that the development of any enterprise depends on its ability to introduce new products to the market over time to stay relevant. Likewise, in modern-day business, technology enables businesses to attract new customers beyond their geographical locations and be in touch with the new reality of business practices. The informal sector constituted over 58% of the total population of Nigerian firms in 2021 [3,4], and is a fertile ground for growing TC needed for economic development [5]. Over 2.5 billion people consume food outside of the home daily due to changing demography and convenience [6]. TC is defined as the ability

to absorb and adapt technologies into local settings, and its components are investment capability, innovation capability, production capability, marketing capability, and linkage capability [7,8]. The technological capability of an informal food service operator will be enhanced by the ability of the business owner to deploy, develop, utilize, and integrate technological resources with other equipment required to run the business effectively, regardless of resource constraints [9]. Hence, some level of creativity in the informal food service business is required to effectively use the available technology in its operation and achieve the required output. This study, therefore, examines the effect of TC on informal food service operators by focusing on the community of informal food service businesses in a specific rural area and the effect that technological capability could have on their business performance.

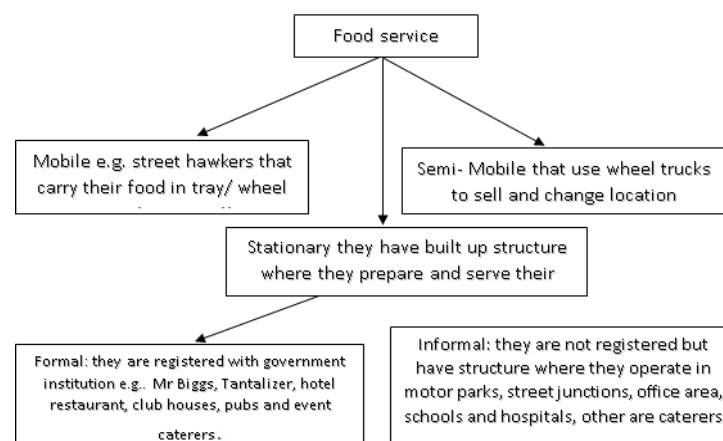
## 2. Literature Review

Despite its significance, the informal economy has received limited attention from innovation studies scholars. However, Kraemer-Mbula and Wamae [10] have emphasized the need to consider the African context, where the informal economy accounts for over 75% of jobs. They argue that neglecting the informal economy in innovation studies would be a missed opportunity, as it is a substantial and interconnected sector with unique dynamics that differ from the formal sector. Rivera-Huerta and Lopez-Lira [11] further mentioned that investigating innovation in the informal sector is crucial due to its size, links to the formal sector, and distinct characteristics. The initial literature on technological capability (TC) has been examined for nearly 40 years, dating back to the early literature on model development on TC in 1980. For this study, technological capability is described as the ability to leverage what modern technology can contribute to a nation's economic growth while not affecting the sector's efficiency. Firms must be able to evolve continuously in an age of rapid technological change. Lall [8] provides the most comprehensive illustrative framework on the types (investment, production, and linkages) and levels (basic, intermediate, and advanced) of TCs. Previous researchers have studied various types of TCs and mentioned a variety of capabilities in their studies, such as acquisition capability, investment capability, production or operation capability, learning capability, and process and product change capability, process and product-centered capability, innovation capability, human resource capability, networking capability, and research and development capability [12–15]. Other studies have focused on new insights to address the relationship between technological capability and the successful performance of firms [16–18], which may be missing in the food service industry, and most especially the informal food service sector. Lestari and Ardianti [19] explained technological capability as the accrued knowledge, skill, experience, and organizational base used by a firm to acquire, develop and use technology to achieve a competitive advantage. SMEs in developing countries can only acquire TCs via technological outsourcing through importation or learning [20]. Similarly, Nwankwere [21], Oluwale et al. [22], and Efunwole et al. [5] studied the technological capability and successful performance of other sectors such as food and beverage, Nigeria's automobile sector, and informal bakery businesses. Various global studies have established a positive relationship between technological capability and business performance [19,20,23]. Reichert and Zawislak [24] further mentioned that performance is usually assessed based on traditional financial measures, internal efficiency, or market performance. However, TCs have been described differently in studies based on the context in which the business perceives the importance of technology. Studies such as [25–27] have examined the capabilities surrounding information technology (IT) and the competitiveness of a business, including value capability, dynamic capability, competitive capability, IT infrastructure, IT business experience, IT relationship resources, and IT human resources. This study will, however, focus on the types of TCs related to innovation capability, marketing capability, investment capability, and production capability in relation to the food service business in Nigeria.

Innovation capability is the ability to develop new ideas to guarantee business success in the market. The ability to conceptualize of and create novel and valuable products or knowledge is essential to the progress of any business. Saunila [28] defines innovation capability as consistently transforming expertise and ideas into products, processes, and systems to benefit the organization and stakeholders. This concept applies to small, medium, and large enterprises, because they compete within the same space. According to [29], larger businesses always seek a management paradigm that can offer them flexibility, creativity, and growth. This is described as an internal entrepreneurship hunt within the company, with the ability to explore the same creativity for the food service business. In the same vein, various studies have investigated the importance of marketing capability [30,31], investment capability [32,33], and production capability [34,35] and their varying levels of importance to the success and performance of businesses, specifically small and medium-sized Enterprises (SMEs).

Small and medium-sized enterprises (SMEs) need more than just technical skills and basic management abilities to be innovative. Findings also indicate that large corporations and research institutions serve as ideal incubators for entrepreneurs who can successfully establish and grow knowledge-based and innovative SMEs, aligning with the Nigerian government's goals [36].

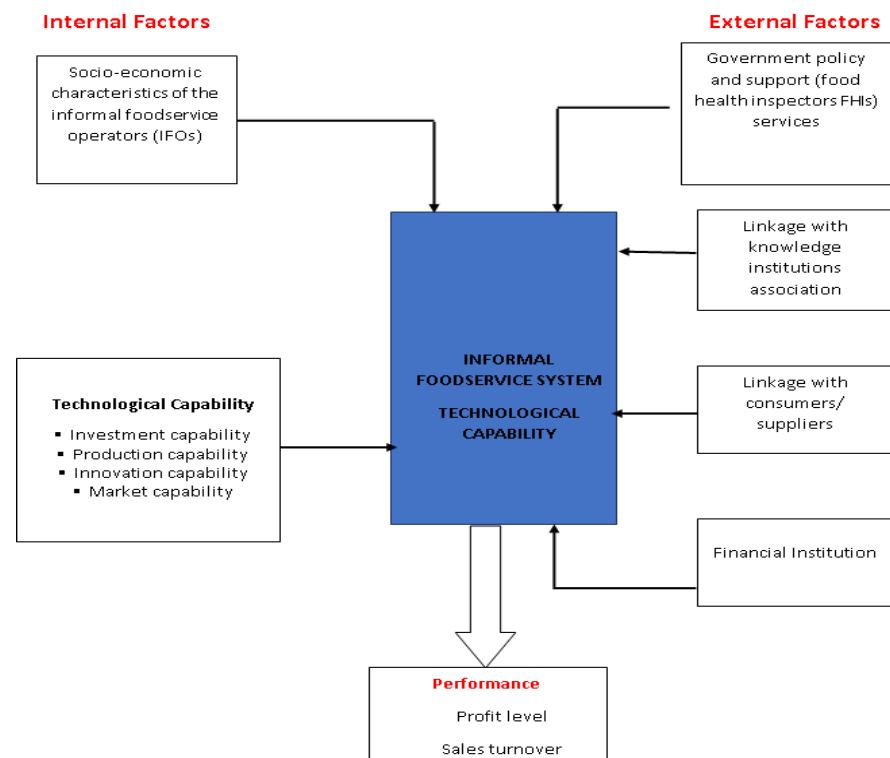
The food service industry includes all the events, services, and businesses that prepare and serve meals to members of the public who eat away from home [37]. The sector encompasses all types of canteens, eateries, and fast-food joints. It also involves formal and informal institutional food operations at locations such as street junctions, motor parks, roadsides, schools, offices, and hospitals, as illustrated further in Figure 1 below. Others include food truck operators, street hawkers, and event caterers. The changes in world demography have led to an estimated 2.5 billion people worldwide consuming food outside their homes daily, possibly because they find it cheap or convenient [38,39]. Akanji et al. [40] stated that 95% of working-class Nigerians in urban settings eat outside their homes and are, therefore, vulnerable to hazards attributed to poor-quality meals, as stipulated in one of the Sustainable Development Goals (SDG) of the United Nations, which can lead to a lack of economic growth if not properly managed. Although TC has been applied in the electrical appliances manufacturing [41], biotechnology, automotive [15] and telecommunications [42] industries, to mention but a few, there is a dearth of information on the TC of informal food service operators in Nigeria [43]. It is therefore important to look into the effects of TC on the performance of the informal food service sector in Nigeria because it deals directly with human health based on food consumption. Since the major aim of using technology in this system is to achieve high revenue, modify operations, improve customer experience, reduce costs, and consequently increase profit [44], this study determines the effect of technological capability on the performance of food service operators in some Local Government Areas in Oyo State, Nigeria.



**Figure 1.** Food service categories. Adapted from Ref. [45].

### 3. Conceptual Framework

Figure 2 represents an informal food service system's conceptual technological capability and performance framework.



**Figure 2.** Conceptual framework of technological capability and performance of informal food service systems in Oyo State (adapted from Ref. [46], modified by authors).

The central element is the Informal Food Service System Technological Capability. This is the core component of the framework. It represents the technological capabilities within the informal food service system.

**Technological Capability:** Listed capabilities include investment capability, production capability, innovation capability, and market capability.

**Performance:** Performance outcomes are indicated by profit level and sales turnover.

**Internal Factors:** These internal factors directly impact the technological capability of an informal food service system.

**External Factors:** Several external factors influence the system, including government policy and support (food health inspectors, FHI services), linkage with knowledge institutions/associations, linkage with consumers/suppliers, and collaboration with financial institutions. These elements collectively highlight how technological capability is influenced by internal and external factors, which in turn affects the performance of the informal food service system.

### 4. Material and Method

#### 4.1. Research Design

A quantitative approach was employed to determine the effect of technological capability on the performance of food service operators at Oyo State. The study area was Oyo State, Nigeria. Informal food service operators in the area were administered a questionnaire, and their respective responses were noted immediately. A total of 180 operators were selected, that is, 30 operators for the six LGA areas selected, with 169 questionnaires retrieved. A structured questionnaire consisting of closed-ended questions that covered the determinants of technological capability was used, using a Likert scale, and the performance of the food service outlet was based on sales turnover and profit level. The Likert

scale values used as determinants of technological capabilities were as follows: none (1), fair (2), good (3), very good (4), and excellent (5). At the same time, performance was measured based on the level of sales turnover, considering profit improvement (1) and no improvement (0). Binary logistics regression was deployed for data analysis to measure the odds or likelihood of improved performance based on technological capability variables, namely, investment capability, production capability, innovation capability, marketing capability, and linkage capability.

Binary Logistic Model

$$Y = \ln [p/(1 - p)] = a + b_0X + e$$

$$Y = \text{Log} (P/1 - P) = \beta_0 + \beta_1X_1 + \beta_2 \beta_2 + \dots + \beta_nX_n$$

Y = the dependent binary variable (IMPROVEMENT = 1, NO IMPROVEMENT = 0)

P = probability Log = natural logarithm function

$\beta_n - \beta_n$  = Regression coefficient

X1 - Xn = independent variables

(P/1 - P) = odds in favour of performance

Y (Performance variable) = Sales turnover and profit level

X (Independent variables) = Technological capability

#### 4.2. The Study Area

The study area was Oyo State, Nigeria. Oyo State falls within the Southwest geopolitical zone of Nigeria alongside Ekiti, Lagos, Ogun, Ondo, and Osun states. Oyo State is situated 703.6 km southwest of Abuja, Nigeria’s capital city, and 232.7 km south of Lagos, Nigeria’s commercial capital. Oyo State is the largest state by population in Nigeria’s southwest geopolitical region, with a total area of 28,454 km<sup>2</sup>. Kwara State borders the state on the north, Osun State on the east, Ogun State on the south, and the Republic of Benin on the west. The state is subdivided into three senatorial districts, as shown in Table 1, with the local government areas and name.

**Table 1.** Study area.

Senatorial District	LGA Urban Area	LGA Rural Area
Oyo Central	Oluyole	Atiba
Oyo North	Ogbomoso south	Kajola
Oyo South	Ibadan northeast	Ibarapa

Oyo State has 33 local government areas and three senatorial districts out of the 774 local government areas constituting the Federal Republic of Nigeria, alongside the 36 states. The homogeneous state has a population of about 4.5 million people, the majority of whom are Yoruba. However, within the state, there are sub-ethnic groups with distinct dialects. Ibadan, Ibarapas, Oyos, Oke-Oguns, and Ogbomosos are the five broad groups that make up the people of Oyo State. The most popular menus include *Amala*, *Ewedu*, and beans stew, also called *Gbegiri* [47,48].

#### 4.3. Population and Sample Size

Figure 3 is the map of Oyo state, the geographical location of the study [49]. The population of the study included all operators in three (3) senatorial districts within Oyo State, which were selected through a stratified sampling technique. In contrast, a purposive sampling method was used to select six (6) local governments within the urban and rural areas. These included operators who make meals in busy areas such as marketplaces, motor parks, and roadsides, and those with structures where they operate their business. There is no recent formal record of the population of informal businesses in Nigeria or in the specific geographical location of the study. However, Adenuga [50] and Onwo and Ohuzulike [51] reported that 80–90% of the total population of Nigeria are engaged in the informal sector. The National Bureau of Statistics [52] recorded a total number of

1,864,954 informal engagements in Oyo State, with no specific reference to the food sector. However, this study only focuses on operators on the street who are independently owned, wherein the operator makes all business operation decisions. Since there are no data on the number of operators in this sector, which could ease the sampling procedure, it becomes very important to adopt various different sampling procedures. First, stratified sampling was employed to select the locations where food service operator activities are predominant, such as major areas in Ibadan, Ogbomosho, and Oyo town. A purposive sampling method was used to select the respondents to be administered the questionnaire, whereby the first respondent was known and selected thus: 30 operators spread across different locations, including motor parks, marketplaces, and street junctions, throughout each of the 6 LGAs in Oyo State, Nigeria, resulting in a total of 180 respondents using the purposive sampling technique for the administration of these questionnaires.

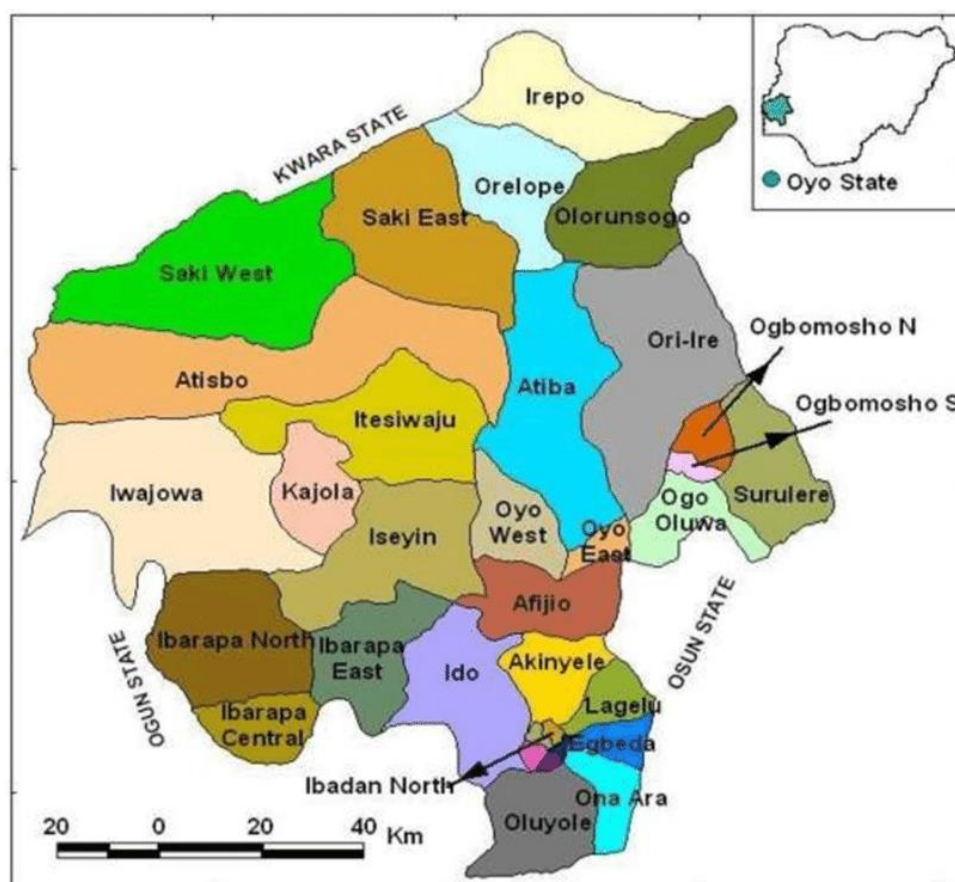


Figure 3. Map of Oyo State. Reprinted from Ref. [49].

## 5. Results and Discussion

### *Socio-Demographic Information of the Study Participants*

Table 2 shows the demographic information of the informal food service operators that participated in the study. Out of 180 questionnaires administered, only 169 useful ones were retrieved and used for the study. The responses showed that 24 (14.2%) participants were male, while 145 (85.8%) were female. The respondents' ages varied from 18 years through to 60 years; 23 (13.6%) of the participants were between 18 and 30 years of age, 56 (33.1%) were aged between 31 and 40 years, 72 (42.6%) were between 41 and 50 years old, 15 (8.9%) were aged between 51 and 60 years, and 3 (1.8%) were above 60 years old. Similarly, 75.7% (128) of the participants were married, 11.8% (2) were single, 3% (5) were separated, 3.6% (6) were divorced, and 5.9% (10) were widowed. The location of the business was also considered as part of the demographic information, and the majority of the participants, 55.6% (94), were conducting their business by the roadside, while 32.5% (55) were using motor parks,

and 11.8% (20) were using office/school areas. The educational qualifications of the study participants ranged from OND/NCE for 43.2% (73), college/secondary education for 36.7% (62), HND/bachelor's for 12.4% (21), primary/school education for 4.1% (7), and no formal education for 3.6% (6). Lastly, the demographic information of the participants captured the years of participant experience in informal business, and the majority of the respondents, 48.5% (82), had 11–20 years of experience, 27.2% (46) had less than 10 years' experience, 17.8% (30) had 21–30 years' experience, and 2.4% (4) had above 40 years of experience in informal business.

**Table 2.** Informal food service operators' demographic information.

Socio-Demographic Background of Informal Food Service Operators (IFO)	Frequency	Percentage
Gender		
Male	24	14.2
Female	145	85.8
Age		
15–30 years	23	13.6
31–40 years	56	33.1
41–50 years	72	42.6
51–60 years	15	8.9
Above 60 years	3	1.8
Marital Status		
Single	20	11.8
Married	128	75.7
Separated	5	3.0
Divorced	6	3.6
Widowed	10	5.9
Location of operation		
Roadside/Street Junction	94	55.6
Motorpark	55	32.5
Office/School area	20	11.8
Highest educational qualification		
No formal education	6	3.6
Primary/School Education	7	4.1
College/Secondary Education	62	36.7
OND/NCE	73	43.2
HND/B.A/B.Ed/B.Sc	21	12.4
Years of experience on the job		
Less than 10 years	46	27.2
11–20 years	82	48.5
21–30 years	30	17.8
31–40 years	7	4.1
Above 40 years	4	2.4

The two performance variables used in the study were profit level and sales turnover. These performance variables were used because the respondents refused to provide information on their financial performance (financial figures). The study strictly adhered to the universally acceptable research ethics of not infringing on respondents' privacy without their consent. Previous studies have also used non-financial performance as a variable [53–57]. Using logistic regression, Table 3 shows that the binary logistic regression was put at a 1% probability level to discover whether there was a significant explanation for sales turnover provided by technological capability variables. The result indicated a significant explanation of improvement in sales turnover according to innovation capability ( $\beta=1.657$ ;  $p=0.003^*$ ) and production capability ( $\beta=3.276$ ;  $p=0.009^*$ ).

**Table 3.** Effect of technological capability on performance (sales turnover).

Technological Capabilities	SE.	Sig		Exp ( $\beta$ )	Unstandardised EXP ( $\beta$ )	
		Lower	Upper			
Innovation capability	0.076	0.003 *		1.657	0.787	1.272
Marketing capability	0.082	0.007		0.043	0.915	1.197
Investment capability	0.068	0.854		2.013	0.906	1.131
Production capability	1.875	0.009 *		3.276	0.817	1.121
Linkage capability	0.134	0.213		2.716	0.7851	1.235
Constant	0.134	0.013		0.823		

Source: Author's survey. \*, Significant =  $p < 1\%$ . SE, standard error. Exp  $\beta$ , exponential Beta df—degree of freedom.

This shows that the technological capability variable significantly affected the performance of the food service system in the study area. The likelihood of these technological capability variables to improve sales turnover was indicated by an Exp  $\beta$  greater than one (1). Table 3 shows that production capability had the greatest likelihood of affecting sales turnover; the higher the ability to produce more meals for consumers, the higher the sales turnover. This was supported by [5], which examined increased production capability-affected sales in the informal bakery sector of southwestern Nigeria. Similarly, an odds ratio (Exp  $\beta$ ) greater than one indicated a positive relationship. At the same time, those values equal to one or less than one indicated either no or a negative relationship respectively. The innovation capability (1.657) is also greater than one. They both indicated a positive relationship between sales turnover and technological capability variables. This also implies that a unit increase in innovation, marketing, and production capability would lead to 1.858, 1.047, and 4.456-fold increases in the performance (sales turnover) of the food service system in Oyo State, respectively. This result corroborates a previous study by [58].

Table 4 shows that the binary logistic regression was carried out at a 1% probability level to show whether there was a significant explanation of the profit of the food service system according to technological capability variables. The results indicated the level of likelihood that increases in technological capability would improve profit level (innovation capability ( $\beta$ —1.657;  $p$ —0.013\*), investment capability ( $\beta$ —2.013;  $p$ —0.004\*), production capability ( $\beta$ —3.276;  $p$ —0.023\*) and linkage capability ( $\beta$ —2.716;  $p$ —0.003\*)). The odds ratios (Exp  $\beta$ ) for innovation capability (1.657), investment capability (2.013), production capability (3.276), and linkage capability (2.716) were positive and greater than one. This indicated a positive relationship between profit level and technological capability variables, which implied that a unit increase in innovation capability, investment capability, production capability, and linkage capability would lead to 1.657, 2.013, 3.276, and 2.716-fold increases in the performance (profit level) within the food service system in the study area, respectively. Thus, as the index of technological capability variables is increased, the sales turnover and profit level of the food service system in Oyo State, Nigeria, will experience a corresponding increase. This result aligns with [59], who reported that investment in technologies by business ventures increased profit. In the same vein, [10]) suggested a strong link between knowledge institutions and knowledge users, including informal food service operators.

**Table 4.** Effect of technological capability on performance (profit level).

Technological Capabilities	SE.	Sig		Exp ( $\beta$ )	Unstandardised EXP ( $\beta$ )	
		Lower	Upper			
Innovation capability	0.174	0.013 *		1.657	0.787	1.272
Marketing capability	0.052	0.145		0.043	0.915	1.197
Investment capability	0.128	0.004 *		2.013	0.906	1.131

Table 4. Cont.

Technological Capabilities	SE.	Sig	Exp ( $\beta$ )	Unstandardised EXP ( $\beta$ )	
	Lower	Upper			
Production capability	1.238	0.023	3.276	0.817	1.121
Linkage capability	1.234	0.003 *	2.716	0.7851	1.235
Constant	0.125	0.141	0.823		

Source: Author's survey. \*, Significant =  $p < 1\%$ . SE, standard error. Exp  $\beta$ , exponential Beta df—degree of freedom.

## 6. Conclusions

The study determined the effect of technological capabilities on the food service system in Oyo State, Nigeria. It can be concluded that technological capabilities (innovation, marketing, and production capability) significantly influenced most participants' sales turnover and profit levels, demonstrating that these success metrics are significantly influenced by innovation, investment, and linkage capability. It could be said that TC is very important to the informal food service sector, considering our results showed improvements in the profit margins of the participants who utilized TC in their business. One of the main challenges surrounding the use of TC in this sector is the government's lack of coordination. It may be recommended that IFOs develop strong linkages with technology-providing organizations to enhance their innovation capability. The government should find a way to properly coordinate this sector, since they are closer to people based on the food service they provide.

**Author Contributions:** Conceptualization, F.T.A., K.T., A.I.O., O.O.O. and C.K.-A.; methodology, F.T.A., K.T. and C.K.-A.; software, K.T., A.I.O. and O.O.O.; validation, F.T.A. and C.K.-A.; formal analysis, F.T.A. and O.O.O.; investigation, F.T.A. and C.K.-A.; resources, K.T. and A.I.O.; data curation, F.T.A., K.T., A.I.O. and O.O.O.; writing—original draft preparation, F.T.A. and C.K.-A.; writing—review and editing, C.K.-A.; visualization, C.K.-A.; supervision, F.T.A., K.T. and A.I.O.; project administration, F.T.A.; funding acquisition, C.K.-A. All authors have read and agreed to the published version of the manuscript.

**Funding:** The research did not receive any external funding.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Obafemi Awolowo University's Research Ethics Committee (Ref: OAU/Tawakalitu Funke Adedeji/1/2024, 14 March 2024).

**Informed Consent Statement:** Informed consent was obtained from all study participants.

**Data Availability Statement:** The study data is safely kept with the authors and will be made available on request.

**Conflicts of Interest:** The authors declare no conflict of interest.

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