European Journal of Interdisciplinary Research and Development
Volume-11 Jan. - 2023
Website: www.ejird.journalspark.org ISSN (E): 2720-5746

MECHANICAL FOOD PROCESSING METHOD AND FOOD QUALITY OF LOCAL DELICACIES IN RIVERS STATE, NIGERIA

Obot, Mary Ifiok
Department of Hospitality and Tourism Management, University of Port Harcourt.

Ndu, Eugene Chigozie, PhD.
Department of Hospitality and Tourism Management, University of Port Harcourt.
Email for correspondence: eugene.ndu@uniport.edu.ng

Abstract
Local dishes restaurant serves a major role in the provision of quick meals in a cosmopolitan area such as Port Harcourt. However, their services need to be assessed for quality to minimize the risk of contamination and poisoning. The objective of this study was to investigate the mechanical food production process on food quality of local dishes restaurants in Port Harcourt. Food production process was dimensioned with Manual Food Processing and Mechanical Food while food quality was dimensioned as Food Taste, Food Texture and Food Attractiveness. This resulted in the stating of three research questions and their corresponding null hypotheses. The descriptive survey research design was used for the study with a sample of 400 respondents drawn from Port Harcourt Metropolis. Data obtained was analyzed using Pearson Product Moment Correlation Statistics and Simple Regression Analysis for answering the research questions and testing the hypotheses. The result showed a strong positive relationship between mechanical food production process showed a moderate relationship with food taste and food texture but failed to have any significant relationship with food attractiveness. Therefore, it was recommended that irrespective of the food production process adopted by local dish restaurants, there is need to continuously consider superior food quality as strategy to satisfying their customers. Also, local dish restaurants should also prioritise chef training as this was proven to enhance food quality.

Keywords: Mechanical Food Processing. Taste. Texture. Attractiveness. Restaurants.

Introduction

The focus of this study stems from the need to examine the quality-of-service delivery offered by the local dish restaurants in Port Harcourt. The incessant occurrence of malnutrition and food borne illness has called for attention in recent literatures (Gudrun, Katja, & Irmgard, 2013; Ezirigwe, 2018; Ndu & Asiegbu, 2021). Food consumption which supposedly should provide nourishment and supports for mankind has increasingly become a major source of illness and mortality amongst both the young and the elderly. There is need to ensure adequate food safety and hygiene consumptions still forms a major challenge to all participants in the food industries, not excluding policy makers, local restaurants and food vendors (Omotayo & Denloye, 2002). Unbelievably puzzling is the criticality of the predicament as records showed that food safety crises caused over to 33 million disability adjusted life years (DALYs) with an

estimated cost of illness placed at US$3.6 billion yearly (Iro, et al., 2020; Ezirigwe, 2018). These illnesses were linked by Ndu and Asiegbu (2021) to poor or ineffective food hygiene and safety management. The manufacture of food that is safe to eat is thus an important topic of discussion since it is a necessary function for public health, and unsafe food has developed into an endemic public health concern in Port Harcourt.

Customers may get dishes that are ready to eat from a variety of establishments, including restaurants and fast-food chains. According to the Food and Agricultural Organization (FAO), fast meals are defined as foods that are swiftly made and supplied in establishments such as fast-food restaurants, shops, market schools, and other such locations. The prices of fast meals are quite low, and they provide a wide range of regional specialties and classic dishes. Local restaurants provide both the preparation and servicing of meals for consumption, with the meals often being consumed on the premises and needing just a short amount of time from the time an order is placed and the time the food is brought out to the customer.

Uyoyou (2013) observed that local restaurants have high rate of patronage from people of different demographics; so much so that often times these foods outlets may not be able to meet the urgent need of their impatient customers. Because of the rapid pace at which the meals at local dish restaurants are made, it is impossible to rule out the risk of food contamination due to negligent practices. There is always the risk of the utensils and equipment that are used for the preparation and serving of meals not being completely cleaned. There are several fast meals that are cooked under unsanitary conditions, thus Cleanliness of the environment; meal exposure, the use of personal Protective equipment and proximity of meal preparation space from sources of contamination such as waste basket, used water etc. constitute a major challenge to fast food operators. Despite the warnings and recommendations of WHO on the operations workflow and the use of PPE, poor hygiene practices is still prevalent amongst these restaurants. This prevalent situation calls for urgent need to address the operations management technique, methodology and food making process of local dish restaurant. The foregoing describes the essence of this study.

Aim and Objectives of the Study

The aim of this study is to investigate the relationship between mechanical food production process and food quality of local dishes restaurants in Port Harcourt.

The precise objectives of the study are to;

1 Examine the relationship between mechanical food processing and texture of local dishes restaurants in Port Harcourt.

2 Examine the relationship between manual food processing and attractiveness of local dishes restaurants in Port Harcourt.

3 Examine the relationship between mechanical food processing and attractiveness of local dishes restaurants in Port Harcourt.

Literature Review

Theoretical Foundations

Total Quality Management Theory (TQM): The roots of total quality management may be traced back to the experiences of many industries, namely the management practices of Japan.

According to Fakunde (2021), the most successful and efficient management methods are those that need the optimum use of existing resources, including both people and material resources, in order to accomplish the goals of the organization. This focuses mostly on quality and handles issues related to the accuracy of teams, the contentment of customers, and the provision of adequate services (Ojo, 2006). Total quality management is a theory and a set of guiding or controlling principles that are implemented in order to bring about continuous organizational growth in response to changes that occur in the surrounding environment. Thus the theory of total quality management is hinged on the philosophical principle and culture that directs all organisational efforts and resources towards the ultimate satisfaction customers and the continuous improvement of operations management process of a business organisation. Ojinaka (2011) puts it that TQM implies that everyone in an organisation (both employee and management) in producing goods and services that satisfy their customers.

The central theme of TQM is customers' satisfaction; a position reiterated by Mahajan and Gothankar (2020). They argued that the delighting the customer is a central purpose across the fast food industry. According to Russell (2013) TQM is an approach to management that focuses on extensive achievement aimed at customers 'satisfaction and the total involvement of all organization members as well as advancing the transformation of tangible and intangible products, and the mental programming. Milosan (2012) opined that TQM is an all-embracing practice of management that focuses on all functional areas and entirety of the firm, for excellence and constant advancement. With its anchor as "do it well the first time", "zero defects and zero waste"; TQM involves all aspects of operations management of organisation. The theory of TQM is hinged on certain principles and philosophy. Fakunde (2021) outlined that in practice, the concept and philosophy of TQM is the concept of Total Quality (TQ) and Quality Management (QM). Ndu (2018) argued that TQM utilizes strategy, effective communications and data to incorporate the quality discipline into the organization's culture and activities. Therefore the elements of TQM are set of ideologies or principles upon which the organization is to operate. These elements according to Pekar, (1995), American Association of Quality (2017), Ndu (2018), Fakunde (2021) are customer satisfaction, total employee involvement, continuous improvement, process-centered, integrated system, strategic and systematic approach, and communication.

The theory of TQM plays a vital role in today's highly competitive environment. Business firms have come to realise that to gain competitive advantage, there is need to offer superior quality products to satisfy customers' need (Hoang et al., 2006; Zakuan et al., 2008; Bon & Mustafa, 2013; Arif & Qin, 2015). Delivering quality products to meet customers' expectation forms a holistic basis for customers' evaluation of excellence of service offering (Santos, 2003), and it plays out when customers' expectations are met at all times. The situation calls for requires collaborative efforts from all stakeholders, chief among these stakeholders are managers of hospitality firms, particularly, the owners and managers of local dishes restaurants whose service deals directly with the final consumers. The urgent need to address the operations management technique and food making process of local dish restaurants is call for the adoption of TQM; a central focus of this study.

Conceptual Review

Mechanical Food Processing

Mechanical food processing is the process of converting raw ingredients into edible foods, in a way that could be consumed through the use of mechanised equipment. Unlike manual food processing technique, mechanical food processing involves the use of processing machines and system in the preparation and cooking of foods. According to Romina (2022) although, mechanical equipment are built to primarily to facilitate the transformation process of cooking, they are also used for preliminary and auxiliary cooking functions such as food handling, preparation and packaging. In modern food production settings the uses of a broad variety of machinery, equipment gasses instruments and even robotics have gained more acceptances across the world (Ivanov, Webster & Berezina 2017). The food industry has continues to exhibit continuous innovations to meet up with the growing demands of customers. The expectations of customers have changed in terms of delivery time, novelty, and value for money, excitement and a safe food. Therefore meeting these needs may be technically impossible with the use of manual tools; hence a more mechanized machinery and equipment are required. Mechanized equipment and even robots have come a long way in a short amount of time, and they are becoming increasingly common in the hospitality and tourism industries. These machines are increasingly used to provide social services for customers, such as housekeeping and check-in/check-out at hotels, and food ordering and preparation at restaurants. (Bucak & Yigit, 2021). The event of Covid-19 has also contributed immensely to innovative ideas on how to process foods more efficiently without too many human efforts. The pandemic specifically fueled the use of mechanical food processing and the adoption robotics in hotels and restaurants to enhance sanitation and physical distancing in more advanced countries like China (Bucak & Yigit, 2021; Shin & Kang 2020). However, in the use of mechanical food processing; the discussion of food quality is a subject heavy debate and criticism particularly in local dishes restaurants where customers are already accustomed with the foods prepared using manual processes. This challenge is not peculiar to Nigeria alone; For example, in a number of China's hotels that provide robot services in their restaurants and hotels, preparing food is not considered to be an activity that is suitable for robots to do (Ivanov & Webster, 2019) Perhaps because people have low expectations for the quality of food that is prepared by robots (Nozawa, Togawa, Velasco, & Motoki, 2022; Seyitoglu, Ivanov, Atsiz, Cifci, 2021; Bucak & Yigit, 2021) The development of the food business has resulted in the increasing mechanization of the preparation of the food served in restaurants; yet, human chefs are still required to oversee the final stages of the cooking process. The use of mechanical apparatus seems to be the prevalent practice at the moment and is likely to remain so going ahead. As a result, it would be fascinating to explore whether or not people believe that the mechanical food process has an impact on the quality of meals that are created by local cuisine restaurants in Port Harcourt.

Concept of Food Quality

Quality has been defined by Abbot (1995) and Feigenbaum (1991) as the measure of excellence. It was later described by Gilmore (1974) and Levitt (1972) as the extent to which

specific demands are met. Thus quality connotes how well or the extent to which requirement of customers is satisfied. Quality does not only describe the expectations of users but include the experience of satisfaction derived by customers from patronising a business organisation. This implies that quality is the extent to which the expectations of the customers are fulfilled (Crosby, 1979). This was also the position of the International Standard Organisation (ISO) when it defined quality as the „degree to which a set of inherent characteristics fulfils requirement". Juran (1998) defined quality as the "fitness of use" in its most straightforward form. The quality of food, especially its safety, has been a primary concern for those working in the food sector, in large part as a result of a string of scandals and crises involving food safety. (Aung & Chang, 2014). Food consumption which supposedly should provide nourishment and supports for mankind has increasingly become a major source of illness and mortality amongst both the young and the elderly. The strain on quality foods is revealing with rising need to ensure adequate food safety and hygiene consumptions still forms a major challenge to all participants in the food industries (Omotayo & Denloye, 2002). This is revealing as governments and consumers are increasingly concerned with the safety of and quality of food supplies. However, the quality of the food items constantly changes as they make their way through the supply chain, which may have important implications not just for people's health but also for society, the economy, and the environment. (Ndu & Asigbu, 2021; Yong, Dong, Chunming, 2018). Demands for quality foods have necessitated the need to design and re-design their operations.

The survival of every business is chiefly reflected in how well it can satisfy her customers. Parisa Akhtari, Amir and Ahmad (2015) Customers are the enterprises' source of both financial and intellectual capital, both of which are essential to the companies' continued existence. They emphasized that the mindset and the perceived level of devotion in delivering what the consumers want is the most important factor in the sustainability of the company. Many businesses have made the strategic decision to meet the needs of their customers, both now and in the future, by making concrete efforts to meet those needs, as well as by providing products of a quality that exceeds the standards they have set (Moharami, 2008). Today's businesses are acutely aware of the need of maintaining high levels of customer satisfaction in order to maintain both their position as market leaders and their customers' continued patronage. This was described by Fani et al., (2011) as the primary indicator of quality. Just like business organization in the oil and gas sector, manufacturing and telecommunications industries, food restaurants need to understand that deliberate efforts to promote its relationships with the customers and emphasis on improved products quality is key to promoting customers' satisfaction and retention.

As earlier explained in the study quality measured the rate of customers' satisfaction from patronizing a business organisation. The measures of food quality adopted for this study include food taste, food texture and food attractiveness.

Food Taste: Taste is one of the generally accepted attribute of judging the quality of food. Sense of food flavor or savour describes the taste of food when perceived when they are brought in contact with the tongue (Dictionary.com). It is the perception of quality perceived by

customers when a food substance reaches the mouth. Food taste is a generic quality of food which encompasses

Food Texture

The evaluation of texture is one of the most important aspects of sensory analysis. Rather than the absence of flaws, one need to judge the quality of a food based on its texture since it is a better sign of how fresh it is, how well it was prepared, and how satisfying it is to (Szczesniak, 2002). It has influence on the taste, quality, and safety of the food. The texture of the food is yet another quality indicator criterion. For example, the texture of the meal has an effect on how fresh it is. Texture of the meal and mouth feel is the two most important factors that determine a consumer's acceptance and liking of a food product (Mazzucchelli, 1996). Meals companies have a responsibility to consider the textural aspects of their products in order to maintain the quality of their food and the acceptance of their customers. Consumers seldom comment on the texture of the food they eat because they often take it for granted and try to avoid situations in which they are directly questioned about the topic.

Food Attractiveness

Food attraction is another major parameter for measuring food quality and acceptance. Elsweilercet al. (2017) provided evidence showing that a users food preferences are affected by its visual attractiveness. Food attractiveness refers to the positive feelings a customer experience from the visual display of food. It is a sense of attraction and appalling view a customer has regarding food displayed. Uyoyou (2013) observed that local restaurants have high rate of patronage from people of different demographics; so much so that often times these foods outlets may not be able to meet the urgent need of their impatient customers.

Empirical Review

Mechanized Food Process and Taste

Dorin (2018) conducted a study on product and process production of food: a new perspective on delivering food quality. The purpose of this paper was to conduct a literature review with the objective of identifying the most significant contributions made to the field in relation to the implications of the two distinct methods or processes of food production, namely mechanized and traditional methods or processes of food production. In the context of the production of food, innovation can take many forms. These forms include the renewal of products and technologies as well as changes to production processes. According to the findings of the study, implementing novel processes or methods in production and distribution can have an effect on the quality in terms of both flavour and appearance.

A research project titled "An Evaluation of Critical Factors Influencing Mechanized Food Product in the Food Industry: A Case Study of China," which was carried out by Bei (2012), is a good example of the latter. The purpose of this paper was to investigate the important mechanized factors that play a role in food production within the food industry and to identify the roles that these factors play in Chinese food companies. After conducting a literature review of cooking innovative factors in the food industry and its characteristics, it began by

determining the three most important factors that have an effect on the process of developing new products and processes within the food industry. The significance of each factor was then evaluated, and a case study of the China Mengniu dairy company served to shed light on the topic. The results of this analysis revealed that in the Chinese food industry, market research played the most important role in the methods of food production. The findings indicated that the process of food product can help food companies improve their quality of food they produce and these qualities will be evident in the comparative taste, texture and presentation of the end product of the food production process. It could therefore be hypothesized that:

H0:1 there is no significant relationship between mechanical food processing and taste of local dishes restaurants in Port Harcourt.

Mechanized Food Process and Texture

Sushil and Sonica (2016) did a study on incremental food product innovation for improved food quality production. The study did an online survey and the findings showed that it has become a needed for food product companies to deploy best food mixing machines so as to to produce quality food in terms of fines (texture). The findings further stated that restaurant businesses and bakers should consider using modern food mixing equipment as against the traditional mixing process as it will help improve the smoothness and roughness when needed. They further stated that restaurant and bakery operators that are adopting the new age mechanized method of food production will be able to meet with customers demand, produce faster and in quantity also.

Richard, Derek and Mark (2003) published an article on mechanized food packaging in North Ireland. The study was an explanatory study and it purpose was to reveal the importance of mechanized food packaging and customers texture consideration. They sampled 15 food packaging companies and the result revealed that consumers first of all get attracted to a nicely designed and packaged container which preserves that quality of food. According to the scholars, mechanization of food packaging will help food producers to preserve the nutrients, avoid contamination and also maintain the texture and taste of the food

It could therefore be hypothesized that:

H0:2 there is no significant relationship between mechanical food processing and texture of local dishes restaurants in Port Harcourt.

Mechanized Food Production and Attractiveness

Emily (2013) conducted a study to investigate the impact that the qualities of the packaging material have on consumers' perceptions of the attractiveness of quick service restaurants in the United States. The goal of the study was to discover whether or not the material features of the packaging in which food goods are offered in quick-service restaurants had an effect on customers' perceptions of the beauty of the food products themselves and whether or not these perceptions vary. Every item was put through rigorous testing in an authentic QSR setting. Participants rated the traits' sensory qualities, as well as their utility and credibility. In addition to it, preference and ranking response data was gathered. For the purpose of measuring participant response, a self-administered computerized questionnaire, which had been prepared as a result of the literature study, was used. The findings of the research indicate that even

though the ratings for the sensory attributes did not significantly differ from one another. The researcher went on to say that appealing food presentation and packaging is an enticing component that is integrated in high food quality.

Ottenbacher and Harrington (2009) did research on the process of product packaging innovation in quick-service restaurant chains, and their findings were published in a paper. The purpose of this article was to summarize the actions involved in the packaging innovation process as stated by managers of quick-service restaurants (QSR), as well as how this approach makes QSR more appealing. Six executives from different Quick Service Restaurant chains in the United States were asked to take part in semi-structured interviews with the purpose of gaining a deeper understanding of the aspects and dimensions that underlie effective packaging innovation process practices and appeal. It was found that quick-service restaurants that properly designed the food packaging attracted more consumers, leading to increased sales and customer loyalty.

It could therefore be hypothesized that:

H0:3 there is no significant relationship between mechanical food processing and attractiveness of local dishes restaurants in Port Harcourt.

Methodology

This research study adopted a quasi-experimental research study, which is guided by the kind of phenomena being studied and also because the variables being studied were not within the control of the researcher. Both of these factors contribute to the decision to conduct a descriptive research study. The population of the study comprised of customers who patronise local dish restaurants in Port Harcourt. Due to the unavailability of data to show the number of local dish restaurants in Port Harcourt, the researcher shall purposively select fifty local dish restaurants in Port Harcourt and their corresponding employees shall constitute the population for this study. The population was made up of 400 respondents comprising two employees and six customers from each of the identified restaurants. This approach of sample size determination satisfies the threshold and conditions for sampling size when population is unknown (Sekaran, 2003). The data collection method was solely primary using a well developed questionnaire as major instrument for data collection. The questionnaire was divided into three parts according to its structure (section A, B and C). Section A contained the demographic data of respondents; Section B consisted of items relating to the independent variable (Food Production Process) while Section C deals with questions relating to the dependents variable (Quality).

The questionnaire was structured on five (4) points Likert scale ranging from 1-4 as shown thus;

Strongly Agreed 4
Agree 3
Disagree 2
Strongly disagree 1

The face and content validity were ascertained by the supervisor of this research effort. A reliability test was conducted on the research instrument and a Chronbach Alpha value of .852

was obtained. The alpha value is greater that 0.70 which is the minimum threshold for reliability acceptance (Cronbach, 1978; Nunnally, 1978).

Table 1: Questionnaire Response Rate

Questionnaire	Frequency	Percentage (%)
Sample size	**400**	**100**
Number Administered	**400**	**100**
Number Retrieved	**369**	**92**
Number used	**348**	**87**

Table 1 shows the response rate of the questionnaire administered for the study. As earlier marshalled out, the sample size of the study comprises selected local dish restaurants in Port Harcourt. A total of 400 questionnaires which represent 100% of the sample size were administered. Out of these, 369 responses were retrieved which accounts for about 92% of the sample size. However 21 (5%) copies of the retrieved questionnaire were wrongly filled and were not considered for the analysis, giving rise to 348 valid copies of the research instruments which amount to about 87% of the sample size. Thus these 384 samples constituted the data for this study.

Demographic Data of Respondents Presentation

The analysis reveals the gender distribution of the respondents as follows: 47 respondents which represents about 13.5% were male, 301 respondents which account for about 86.5% were females. This result shows therefore that majority of the respondents are females. The age of the respondents revealed that 14 respondents which accounted for about 4% were within the age range of 18 to 25 years, 29 respondents which is about 8.3% of the sample size were within the ages of 23 to 35 years, 77 respondents which accounted for about 22.6% were within the ages of 36 to 45 years, 116 respondents which represented about 33.1% were within the ages of 46-55 years while only 110 respondents which consist of 31.4% were over 56 years of age. This result shows that majority of the respondents are above the age of 55. This implies that local dish restaurants are mainly operated by the elderly since about 64.5% were over 45 years of age. The level of educational qualification of the respondents revealed that 133 respondents which constitute about 38.2% had Ordinary level certificate, 105 (30.2%) had Ordinary/Higher National Diploma, 85(24.4%) had bachelor's degree, 22(6.3%) had Master's degree while 3(0.9%) had doctorate degree. Thus the results showed that majority of the respondents (68.4%) are not graduates. The marital status of the respondents shows that 268 respondents (77%) were married while 63(18.1%) were single while 17 which is about 4.9% were widowed. This shows that majority of the respondents were married. On how long the respondents have been running their restaurants business the analysis revealed that 80 respondents which constitute 23.0% have spent between 1 to 3 years on the business, 151(43.4%) have been running the business for 4-6 years, 65(18.7%) have been running the business for 6-8 years of

experience 30(8.6%) have stayed for 8-10 years while only 22 respondents which constitute about 6.3% have been operating the business for more than 15 years.

Inferential Statistics (Bivariate Analysis)

In this section, the secondary analyses from the results of the hypotheses are presented with the test conducted using Pearson's Product Moment Correlation Coefficient and simple regression analysis at 95% confidence level which was adopted for the probability for either accepting the null hypotheses at ($p>0.05$) or rejecting the null hypothesis at ($p<0.05$).

Test of Hypothesis One

H0:1 there is no significant relationship between Mechanical Food Processing and Taste of local dishes restaurants in Port Harcourt.

Table 2: Mechanical Food Processing and Food Taste

Correlations

		Mechanical Food Processing	Food Taste
Mechanical Food Processing	Pearson Correlation	1	.649**
	Sig. (2-tailed)		.000
	N	348	348
Food Taste	Pearson Correlation	.649**	1
	Sig. (2-tailed)	.000	
	N	348	348

**. Correlation is significant at the 0.00 level (2-tailed).

From the outcome in the table above, it was revealed that a significant and moderate positive relationship exists between mechanical food processing and food taste. The correlation showed a statistic ($P=0.649$, $p<0.005$) which indicate that there is a moderate positive relationship between the two variables. The extent of this relationship is shown in the regression result below

Table 3 Model Summary

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.649[a]	.421	.391	1.08821

a. Predictors: (Constant), Mechanical Food Processing

Table 4: Coefficientsa

Table 4: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.713	.166		10.291	.000
	Mechanical Food Processing	.244	.063	.649	3.883	.000

a. Dependent Variable: Food Taste

The table above shows the model summary and coefficients of the regression analysis. While correlation establishes that there is a significant relationship between Mechanical food processing and food taste, regression analysis shows the magnitude of the relationship. Thus from the result, R2 value of 0.421 shows that mechanical food processing is a moderate predictor of taste of local dishes as it boast of 42.1% predictive capacity of food taste. This implies that mechanical food processing can only predict food taste to the tune of 42.1%. The result also reflects a beta value β of 0.649 (p-value 0.000). The regression models becomes =1.713+.0.649*MEFP.

Since the p-value 0.000 is less than the level of significance (0.005), the null hypothesis H0 is not upheld. Therefore the alternative hypothesis is which states that there is a significant relationship between Mechanical Food Processing and Taste of local dishes restaurants in Port Harcourt.

Test of Hypothesis Two

H0:2 there is no significant relationship between Mechanical Food Processing and Texture of local dishes restaurants in Port Harcourt.

Table 5: Mechanical Food Processing and Food Texture

Table 5: Correlations

		Mechanical Food Processing	Food Texture
Mechanical Food Processing	Pearson Correlation	1	.481**
	Sig. (2-tailed)		.002
	N	348	348
Food Texture	Pearson Correlation	.481**	1
	Sig. (2-tailed)	.002	
	N	348	348

**. Correlation is significant at the 0.02 level (2-tailed).

From the outcome in the table above, it was revealed that a significant and moderate positive relationship exists between mechanical food processing and food texture. The correlation showed a statistic (P=0.484, p<0.005) which indicate that there is a low positive relationship between the two variables. The extent of this relationship is shown in the regression result below

Table 6: Model Summary

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.481[a]	.231	.227	1.09659

a. Predictors: (Constant), Mechanical Food Processing

Table 7: Coefficientsa

Table 7: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.860	.159		11.676	.000
	Mechanical Food Processing	.180	.058	.481	3.096	.002

a. Dependent Variable: Food Texture

The table above shows the model summary and coefficients of the regression analysis. While correlation establishes that there is a significant relationship between Mechanical food processing and food texture, regression analysis shows the magnitude of the relationship. Thus from the result, R2 value of 0.231 shows that mechanical food processing is a low predictor of texture of local dishes as it only boast of 23.1% predictive capacity of food texture. This implies that mechanical food processing can only predict food texture to the tune of 23.1%. The result also reflects a beta value β of 0.481 (p-value 0.002). The regression models becomes =1.860+.0.481*MEFP.

Since the p-value 0.000 is less than the level of significance (0.005), the null hypothesis H0 is not upheld. Therefore the alternative hypothesis is which states that there is a significant relationship between Mechanical Food Processing and Taste of local dishes restaurants in Port Harcourt.

Test of Hypothesis Three

H0:3 there is no significant relationship between Mechanical Food Processing and Attraction of local dishes restaurants in Port Harcourt.

Table 8: Mechanical Food Processing and Food Attractiveness

Table 8: Correlations

		Mechanical Food Processing	Food Attractiveness
Mechanical Food Processing	Pearson Correlation	1	.266**
	Sig. (2-tailed)		.231
	N	348	348
Food Attractiveness	Pearson Correlation	.266**	1
	Sig. (2-tailed)	.231	
	N	348	348

From the outcome in the table above, it was revealed that no significant relationship exists between mechanical food processing and food attractiveness. Though correlation showed a statistic (P=0.266) this is not significant because the p value 0.231 is greater than 0.005 (p>0.005); which clearly does not satisfy the minimum threshold for rejecting a null hypothesis

at a 95% confidence level. Thus implies that there is no significant relationship between mechanical food production process and attractiveness of food in local dish restaurants in Port Harcourt. Therefore the need for regression analysis would not be necessary.

Since the p-value 0.231 is greater than the level of significance (0.005), the null hypothesis H0 which states that there is no significant relationship between Mechanical Food Processing and attractiveness of local dishes restaurants in Port Harcourt is upheld.

Discussions of Findings

This section discusses the findings of the study based on the analyses. It indicates how this study and previous studies are related or differ in certain perspectives.

The second findings of the study emanated from the result of hypotheses four, five and six which south to examine the relationship between mechanical food production process and the measures of food quality ; which are food taste, food texture and food attractiveness.

The study found that there is a significant relationship between mechanical food production process (as a dimension of food production process) and the food quality. Specifically, the result showed a value of (r=.649, .481, .266 at p=000<.005) for food taste, food texture and food attractiveness. However, it does not have a significant relationship with food attraction. This results if not farfetched since the local dish restaurants typically make use of manual methods of food production and may not be so competent with the use of a mechanised process. These studies agree with that of Dorin (2018) who conducted a study on product and process production of food: a new perspective on delivering food quality. The aim of the paper was to review the most important contributions from literature in terms of the implications of the two types of food production process: mechanized and traditional methods or process of food production. In food production context, innovation has diverse materializations, includes product and technology renewal, and process changes. The study findings revealed that adopting new process or methods in production and delivery can impact on quality, in terms of taste and color.

A similar result was reached by Bei (2012) based on a research that was done on an examination of important elements affecting automated food product in the food business; a case study of China. Bei's findings are similarly consistent with these findings. The purpose of this article was to investigate the important mechanical aspects that play a role in food production within the food industry and to determine the functions that these factors play in Chinese food enterprises. After conducting a literature research of cooking creative aspects in the food business and its features, it began by determining the three most important variables that have an effect on the process of developing new products and processes within the food industry. A case study of the China Mengniu dairy firm was used to shed light on the relevance of each element, which revealed that market research was the most important aspect of techniques of food production in the Chinese food industry. This finding was illuminated by the findings of the study. The findings indicated that the process of food product can help food companies improve their quality of food they produce and these qualities will be evident in the comparative taste, texture and presentation of the end product of the food production process. It is important to note that mechanical food processing is the process of converting raw

ingredients into edible foods, in a way that could be consumed through the use of mechanised equipment. Unlike manual food processing technique, mechanical food processing involves the use of processing machines and system in the preparation and cooking of foods. According to Romina (2022) although, mechanical equipment are built to primarily to facilitate the transformation process of cooking, they are also used for preliminary and auxiliary cooking functions such as food handling, preparation and packaging. In modern food production settings the uses of a broad variety of machinery, equipment gasses instruments and even robotics have gained more acceptances across the world (Ivanov, Webster & Berezina 2017). The food industry has continued to exhibit continuous innovations to meet up with the growing demands of customers. The expectations of customers have changed in terms of delivery time, novelty, and value for money, excitement and a safe food. Therefore meeting these needs may be technically impossible with the use of manual tools; hence a more mechanized machinery and equipment are required.

Sushil and Sonica (2016) did a study on incremental food product innovation for improved food quality production. The study did an online survey and the findings showed that it has become a needed for food product companies to deploy best food mixing machines so as to to produce quality food in terms of fines (texture). The findings further stated that restaurant businesses and bakers should consider using modern food mixing equipment as against the traditional mixing process as it will help improve the smoothness and roughness when needed. They further stated that restaurant and bakery operators that are adopting the new age mechanized method of food production will be able to meet with customers demand, produce faster and in quantity also.

Richard, Derek and Mark (2003) published an article on mechanized food packaging in North Ireland. The study was an explanatory study and it purpose was to reveal the importance of mechanized food packaging and customers texture consideration. They sampled 15 food packaging companies and the result revealed that consumers first of all get attracted to a nicely designed and packaged container which preserves that quality of food. According to the scholars, mechanization of food packaging will help food producers to preserve the nutrients, avoid contamination and also maintain the texture and taste of the food.

Emily (2013) did a research to investigate the impact that the qualities of the packaging material have on consumers' perceptions of the attractiveness of quick service restaurants in the United States. The goal of the study was to discover whether or not the material features of the packaging in which food goods are offered in quick-service restaurants had an effect on customers' perceptions of the beauty of the food products themselves and whether or not these perceptions vary. Every item was put through rigorous testing in an authentic QSR setting. Participants rated the traits' sensory qualities, as well as their utility and credibility. In addition to it, preference and ranking response data was gathered. For the purpose of measuring participant response, a self-administered computerized questionnaire, which had been prepared as a result of the literature study, was used. The findings of the research indicate that even though the ratings for the sensory attributes did not significantly differ from one another. The researcher went on to say that appealing food presentation and packaging is an enticing component that is integrated in high food quality. Ottenbacher and Harrington (2009) did

research on the process of product packaging innovation in quick-service restaurant chains, and their findings were published in a paper. The purpose of this article was to summarize the actions involved in the packaging innovation process as stated by managers of quick-service restaurants (QSR), as well as how this approach makes QSR more appealing. Six executives from different Quick Service Restaurant chains in the United States were asked to take part in semi-structured interviews with the purpose of gaining a deeper understanding of the aspects and dimensions that underlie effective packaging innovation process practices and appeal. It was found that quick-service restaurants that properly designed the food packaging attracted more consumers, leading to increased sales and customer loyalty.

Conclusion

The overall purpose of this study was to investigate the relationship between mechanical food production process and food quality of local dish restaurants in Port Harcourt, Rivers state To achieve this purpose, three hypothesised relationships were tested to determine the relationship between mechanical food production processes against three measures of food quality (food taste, food texture and food attractiveness). The result of the analysis revealed that mechanical food process failed to have a significant relationship with food attraction but had positive and significant relationship with food taste and food texture. The study concluded that irrespective of the food production process adopted by local dish restaurants, there is need to continuously consider superior food quality as strategy to satisfying their customers.

Recommendations

One of the key deliverables of academic exercise of this nature is to address the lingering challenges in the society. The problem food quality of small food vendor like local dish restaurants had been a serious source of worry in Port Harcourt and Nigeria as a whole. This study was conducted to address one of such challenges by examining if the food production process of local dish restaurants in Port Harcourt significantly affects their food quality. In line with the empirical analyses and findings, the following are recommendation of the study;

i. Mechanical food production process showed no significant influence on food attraction, this signifies local dishes are more appealing to customers when presented in local plates and setting. A mixed method is therefore recommended in that while mechanical process may be used to prepare food, the traditional plates and table setting could still be maintained in order to get customers' attention.

ii. Lastly, irrespective of the food production process adopted by local dish restaurants, there is need to continuously consider hygiene and superior food quality as strategy to satisfying their customers.

Contribution to Knowledge

a. Theoretical/Academic Contribution: This study has contributed significantly to existing literature and theoretical validations. The study will serve as an additional repository of literatures on food quality and food production process of local dish restaurants. Thus future

researchers and academic communities interested in thus area of research will find it very useful.

b. Policy Contribution: The study has also serve as a feedback to government and other stakeholders in the hospitality industry. Firstly is the fact that this study revealed that majority of local dish restaurants operator are predominantly, females (86.5%) and 64% of these women are 45 years and above. Government may consider this sector of hospitality industry suitable for women empowerment programme. This will not only boost the hospitality industry, it will improve the socio-economic welfare of local restaurants operators.

Suggestion for Further Research

The study focused on the impact of mechanical food production process of local dish restaurants on food quality. However, future study may examine how traditional food production method can influence food quality. Also a replica of this study may be conducted in large restaurant and hospitality sectors that offer foods services to the public. This will enable them understand the dynamics and interplay of the phenomena under consideration.

Since the study is domiciled in Port Harcourt, future researchers are encouraged to conduct similar study in other cities within River state and other state of Nigeria to ascertain if the same result would be gathered. This will aid government and other stakeholders in policy formulations.

References

1. Bagozzi, R. P., & Yi, Y. (2012).Specification, evaluation and interpretation of structural equation models. Journal of the Academy of Marketing Science. Doi: 10.1007/s11747-011-0278-x
2. Baridam, D. M. (2001). Research methods in administrative sciences. Sherbrook Associates, Port Harcourt.
3. Boone, H. N., & Boone, D. A. (2012).Analyzing Likert data. Journal of Extension, 50(2). Retrieved from http://www.joe.org/joe/2012april/t t2.php
4. CDC (2021). Agriculture workers and employers: Interim guidance from CDC and the U.S. department of labour. Retrieved 20-4-2021 from https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html
5. FAO, Global food losses and food waste – extent, causes and prevention, 2011, http://www.fao.org/docrep/014/mb060e/mb060e.pdf.
6. FUSIONS (2016). Estimates of European food waste levels. Retrieved from: http:// www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf.
7. Lehtinen, U., & Lehtinen, J. R. (1983).Service quality: A study of quality dimensions. [Unpublished manuscript], Helsinki, Finland OY.
8. Lehtinen, U., & Lehtinen, J. R. (1991). Two approaches to service quality dimensions. The Services Industries Journal, 11(3), 287-303.

9. Mwango, A. (2010). The art and science of food garniture. Being thesis submitted to Vaasan Ammattikorkeakoulu University of Applied Sciences. Degree Programme of Hotel and Restaurant business
10. Nachimias, C. & Nachimias, D. (1976). Research Methods in Social Sciences (Alternative Second Edition without Statistics).
11. Norman, G. (2010). Likert scales, levels of measurement and the laws of statistics. Advance in Health Science Education. DOI 10.1007/s10459-010-9222-y
12. NRDC, Wasted: how America is losing up to 40 percent of its food from farm to fork to landfill, 2012, https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf.
13. Nunnally, J. C. (1978). Psychometric Theory (2nd Ed.). New York: McGraw Hill.
14. Nunnally, J. C., & Bernstein, I. H. (1994).Psychometric theory. New York: McGraw-Hill.
15. Oliver, R.L. and Swan, J.E. (1989) Consumer Perceptions of Interpersonal Equity and Satisfaction in Transactions: A Field Survey Approach. Journal of Marketing , 53, 21-35. https://doi.org/10.1177%2F002224298905300202
16. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: a multi-item scale for measuring consumer perceptions of the service quality. Journal of Retailing, 64(1), 12-40.
17. Paswan A.K., Spears N. and Ganesh G. (2007) The Effects of Obtaining One's Preferred Service Brand on Consumer Satisfaction and Brand Loyalty. Journal of Service Marketing , 21, 75-78. https://doi.org/10.1108/08876040710737840 https://www.researchgate.net
18. Productspeed (2020). Food presentation and general guideline. Retrieved from www.productspeed.com/wp-content/uploads/2020/05/food-presentation-and-general-giudeline-pdf.pdf
19. ReFED (2015). The multi-billion dollar food waste problem. Retrieved from www.refed.com/?sort=economic-value-per-ton.
20. The Culinary Institute of America (n.d). The professional Chef 8th edition. Retrieved from: www.ciachef.edu/uploadedfiles/pages/admissions_and_financial_aid/educators/educational_materials/technique_of_the_quarter/techniques-enhancing
21. Whitney, E.N. and Rolfes, S.R. (2013) Understanding Nutrition. 13th Edition, Cengage Learning, Wadsworth, 667-670. https://www.cengagebrain.co.uk/
22. Wikipedia (2022). Food processing. Retrieved from: www.en.m.wikipedia.org/wiki/food processing
23. Young, L. (2012). "Our biggest problem? Were wasting food. Retrieved from http://www.canadiangrocer.com/topstories/what-a-waste-19736
24. Ashwini, Awasthi,K. and Madhura Kane. 2014: Consumers perceptions and behaviour about brands: Effect of complaint resolutions on social media. International Journal of Marketing & Business Communication 3 (¾), 76-80.
25. Ateke, Brown, Walter and Onwujiariri Jane Chinyere. 2014: Relevance of excellent customer service in organisational competitiveness. West African Journal of Business and Management Sciences, 3(1),87-95.

26. Badghish, Saeed, A., John, Stanton and Johnatan Hu. 2015: An exploratory study of customer complaint behaviour (CCB) in Saudi Arabia. Asian Journal Of Business Research, 2015, 49-67. https://doi.org/doi:10.14707/ajbr.150004
27. Day, Ralph L. 1984. Modeling Choices Among Alternative Responses to Dissatisfaction. Advances in Consumer Research 11. Ed. William D. Perreault. Atlanta, GA: Association for Consumer Research, 496-499.
28. Gelbrich, Katja and Holger Roschk. 2010: A Meta-Analysis of Organizational Complaint Handling and Customer Responses. Journal of Service Research, 14(1), 3-23.
29. Jacoby, Jacob and James J. Jaccard. 1981: The Sources, Meaning, and Validity of Consumer Complaint Behaviour: A Psychological Analysis. Journal of Retailing, 57, 4-24.
30. Nakibin, Davoud, Ishak, Ismail, Malliga, Marimuthu and Ismael Abu-Jarad. 2011: The impact of firm reputation on customers' responses to service failure: The role of failure attributions. Business Strategy Series, 12(1), 19-29.
31. Salami, Charles and Emueje Ibini. 2016: Customer relationship management and competitive advantage in the Nigerian telecommunication industry. Int J Original Res, 2(3), 124-135.
32. Roberts-Lombard, Mornay. 2011: Customer retention through customer relationship management: The exploration of two-way communication and conflict handling. African journal of business management,5 (9), 3487-3496.
33. Susskind, Alex M. 2005: A content analysis of consumer complaints, remedies, and repatronage intentions regarding dissatisfying service experiences. Journal of Hospitality & Tourism Research, 29(2), 150-169.
34. Tronvoll, Bård.2012: A dynamic model of customer complaining behaviour from the perspective of service-dominant logic. European Journal of Marketing, 46, 284-305.