INFORMATION ECOSYSTEM NEEDS ASSESSMENT AND ORGANIZATIONAL PRODUCTIVITY OF CHEMICAL MANUFACTURING FIRMS IN PORT HARCOURT, RIVERS STATE, NIGERIA

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ABSTRACT

This study surveyed Information Ecosystem Needs Assessment and Organizational Productivity of Chemical Manufacturing Firms in Port Harcourt, Rivers State, Nigeria. The study adopted the Cross sectional survey design. The literature reviewed the concept of information Ecosystem Needs Assessment (predictor variable) and Organizational productivity, product quality and profitability as the criterion variables. To ensure accuracy and completeness, the Mixed Method or Triangulation (quantitative and qualitative) was adopted. The population of the study was eight (8) registered Chemical Manufacturing firms in Port Harcourt, Rivers State, Nigeria. The study element comprised of ninety-six (96) respondents drawn from the population members. Based on the nature of the study, structured questionnaire (closed ended) was designed on a 5-Point Likert for the purpose of data collection. Both descriptive and inferential statistics was used for data presentation and analysis (univariate and bivariate variables). The descriptive statistics explained the mean and standard deviation, while the inferential statistics, Spearman's Ranked Order Correlation (available in Statistical Package for Social Science, SPSS version 20) was used to test the hypotheses. The major findings revealed that there was a significant positive correlation between Information Ecosystem Needs Assessment and Organizational Productivity of Chemical manufacturing firms in Port Harcourt, Rivers State, Nigeria. Therefore, organizations wishing to enhance their productivity in terms of quality product and profitability should implement information ecosystem assessment for effective knowledge of the customers' needs, sources of raw material, and other product requirement for effective and efficient production.

Keywords: Information, Ecosystem needs, Assessment, and Organizational Productivity

INTRODUCTION

Information ecosystem needs assessment is a strategic information management tool, capable of assessing the business ecosystem, collect the data, analyse the data and present the result for effective decision making in organization (Khaleel & Nassar, 2018). The first stage of effective and efficient production starts with understanding the ecosystem needs (Singh, Kuma & Khamchandani, 2015). Understanding the environment of business helps the investors to determine the type of product and services to render. Businesses failed because investors have not considered the environment as a critical factor in terms of the cultures of the people, what they are intended to buy, their economic power, that they can buy and the source of raw materials for manufacturing. Human needs is an essential factor that predict the success of any business be it manufacturing or servicing company. In the traditional system feasibility study are carried out, moving from one environment to another asking people questions and pricing the goods that are already on the market. This process is time consuming and may not yield maximum result. Information system is an online analytical processing that is capable of collecting information from different distributed databases and data warehouses of customers and manufacturing, store and process this information in real time. It looks at various parameters such as the acceptability of product by customers and its impact on the success or failure of investment projects, in addition, it identified and analyze the factors that affect the product manufactured or its acceptance in the market (Khaleel & Nassar, 2018). It provides the structure, where software coded by experts Small and Medium Enterprises

(SMEs) can act like organisms in the society with the main goal of enhancing competition among similar manufacturing organizations (Nasiopoulos, Damianos & Sakas, 2014). This fact has triggered the changed from the traditional information system to a modern and supplicated information system that is able to act fast with the dynamic and competitive environment. Information system (IS) as an asset, it is an investment expected to bring benefits to the company (Fuller, Strehlow, Schmidt, Bodin, & Danke, 2023).

Information ecosystem assessment analysis is business intelligence (BI) platform that exploit business insight for management decision making (Azambuja & O'Brien, 2012). It uses statistical, mathematical and scientific tools to find out the relationship between large groups of people when carrying out business transaction online (Alavi, Tavana & Mina, 2021). It is capable of finding customers' needs, suggest possible way of solving online problems. Customers satisfaction has always been the major problem of business owners or investor, they have been facing problem of what to invest in, who are the potential consumers, what time is suitable for investment (Kim & Chaib, 2017). It solved the numerous problems facing the consumers, government and investor today. Information Ecosystem Assessment is all about what the society needs, what the society are ready to consumed (potential customers), it is capable of gathering the right information for effective decision taking compare to the traditional business or local environment (Durugbo, 2020).

The manufacturing organizational are faced with numerous problems, from sourcing of raw material to product quality and profitability, hence the need for the investigation of the capability of Information Ecosystem Assessment for information/data sourcing, collection, processing and storing and sharing for effective and efficient manufacturing in terms of quality product and profitability which are the major problem of the traditional organizations.
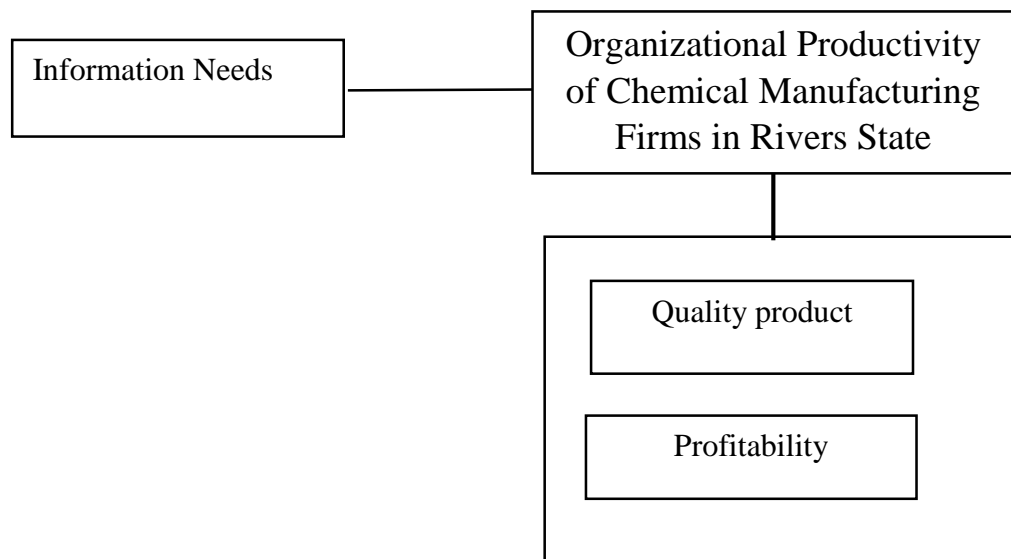
Conceptual framework

Figure 1: Information Ecosystem Assessment and Organizational Productivity

Source: Research Survey, 2024.

THEORETICAL FRAMEWORK
This research is anchored in the Social Network Theory. The Social Network Theory was propounded by Barne in 1954. Barne and Harary (1983) conducted research on Graph theory in network analysis to provide understanding of network of ties across a social class system, the research outcome culminated into a full fledge theory that is known today as social network with contribution from other scholars and field of knowledge. Scott (1991) summarized that there are three lines of research that contributed to the theory's early development. The socio-metric analysis tradition, which relies on graph theory methods from mathematics, the interpersonal relations tradition, which focuses on the formation of cliques and interactions among a group of individuals and the anthropology tradition that explores the structure of community relations in less developed societies**.** On the other hand**,** according to Burt (2004) social network theory came into being as a result of several research carried out from sociology, anthropology, psychology, organizational management and political science specifically to explain the importance of interactions and human relationship to achieving organizational goals. Yuksel and Somyurek (2023) explained that, social networks and its analysis is an inherent interdisciplinary academic field which emerged from disciplines such as Psychology, Sociology, Anthropology, Mathematics, Organizational politics etc.

Concept of Information Needs Assessment
 An Ecosystem Assessment (EA) is a tool that provides information about the state, trend and value of ecosystems and ecosystem services at a specific spatial scale (e.g. at the local authority or county level) and how such services benefit human wellbeing (Shi, 2004). Ecosystem services are "the benefits people obtain from ecosystems*"* (Millennium Ecosystem Assessment 2005). An information need is recognition of a need for specific information to solve a problem, answer a question, or complete a task. It's a cognitive gap that requires filling to achieve a goal or make an informed decision (Singh, Kumar & Khanchandani, 2015). Information Need is one of the most significant and controversial concepts within Information Science. It is a concept that has one of the most substantial literatures and applied widely across disciplines (Naveed & Hassan, 2020). Taylor was particularly interested in how information professionals should respond to these levels, realizing that sometimes some organization may need to roll society back from the compromised level to the conscious level of need in order to properly understand the need that requires resolution (Msoffe & Ngulube, 2017). They also made clear that, regardless of what level of need is being presented, ultimately it is the visceral level of need that requires satisfaction and that we often need external support to help us move from early stage information needs to later stage, more answerable statements of need.

Information needs is primarily used to mean the benefit derived from the information gathered from the environment of business, it seeks to understand how it can improve productivity in organizations and increase the customers' satisfaction (Sharma, Kuwornu, Datta, Yaseen, & Anal,2020). Over the years, various alternatives to information needs have been proposed as better units of analysis for studying information behaviours. Recently we have seen many scholars arguing that the concept of task is such a better alternative. Acharya, Ojha, Patel & Gokhale (2020) proposed such a viewpoint, arguing that information need is primary to task as "information is gathered from various, heterogeneous sources, not primarily to fulfill any expressed formulation of information needs, but in order to make progress in the task." As

opposed to some views that see information needs as decontextualized, free-floating entities that somehow appear and disappear. Acharya, Ojha, Patel and Gokhale (2020) firmly nail information needs into place as part of a practice-theoretic understanding of work place activities.

According to Kalbande (2019) information is a cornerstone of modern civilization on which practically everyone relied. Every individual uses information according to his or her need. Yildiz (2020).) expressed that the progress of any nation will be impossible unless and until the information is made available to people who need it. According to them Policymakers, planners, economists, farmers, instructors, and research academics, doctors, engineers, librarians, and others all demand information in their personal, professional, and daily activities. According to Nwobasi, Uwa, and Ossai-Onah (2013) information needs of the information seekers are like variables that change over time. Similarly, an information requirement is defined as a knowledge gap that must be filled to make a choice or solve an issue. Moreover, Ikoja-Odongo & Mostert (2006) defined that the general information needs were related to finding a research topic, conducting a literature review, reading journals, using online research databases, and conducting other research, workshop and seminar presentations, academic activities, and life events that motivate a researcher towards information seeking.

Concept of Organizational Productivity of Manufacturing Firms

According to Allen and Helms (2006), productivity is characterized as the rate at which an employer, organization, or country produces items and the amount produced corresponding to the amount of time, effort, and money required to generate them. The ability of humans to join assets like unrefined components, work, abilities, capital, hardware, land, protected innovation, administrative capacity, and monetary funding to create labour and products is known as productivity. A company's prospective success is determined by its organizational productivity, or its capacity to effectively implement methods to meet institutional goals (Randeree & Al-Youha, 2009). The capacity of an organization's executives to implement initiatives has a significant sway on the organization's productivity. According to Cho and Dansereau (2010), organizational productivity refers to a company's productivity corresponding to its points and goals. Furthermore, Tomal and Jones (2015) define organizational productivity as an organization's genuine outcomes or production as compared to its planned results. This research adopted quality product and profitability as key indicators for organizational productivity.

Quality product

Product quality is a condition of form, function, and characteristics of a product, whether object or service, which originates from the expected quality level such as durability, reliability, accuracy, ease of operation, product repair, and other product attributes to fulfil and satisfy the needs of consumers or customers (Susanti & Jasmani, 2020. Quality product has the following attributes such as smart **s**imple, measurable, **a**ccepted, **r**ealistic, **t**emporarily (Mary & Nuangjamnong, 2022). Product quality assessment is realized by comparing the results obtained on the basis of concrete measurement of product characteristics, with limits/levels specified in standards, internal notes, specifications or other normative

documents (Taufik, Santoso, Fahmi, Restuanto & Yamin, 2022). Objective quality or "product-based quality" evaluates whether the product performs as it is supposed to, incorporates features that customers do not expect, or has a low probability of failing (Curkovic, Vickery & Dröge, (2000). This type of quality also concerns engineering design, measuring those product components that help form objective quality (Veryzer, 2005). In contrast, subjective quality evaluates quality based on customers' perceptions of the intrinsic cues like product image or product design (Primaturia & Berlianto, 2022).

Recently, the study of subjective quality or industrial design has received much attention in the literature, and several research studies have tried to analyze this concept (Creusen and Schoormans, 2005). Subjective quality can influence preferences of individuals (Top & Ali, 2021).) because it is often the first impression perceived by the customer and it is a way of conceptualizing the objective quality of a product (Kim, 2012)

Profitability
Profitability measured how well the organization can generate revenue from operational processes that have been implemented to ensure the continuity of the company in the future (Manoppo & Arie, 2016). The higher profits generated by a firm will increase the creditor's confidence to provide loans and can increase investor confidence to invest capital, so it can be said that profitability influences capital structure. This supports the Pecking Order theory which states that the higher the profitability of a firm, the lower the use of debt (Guna & Sampurno, 2018). Based on the signal theory, the profits obtained by the company will be a signal from management to show the prospects of a firm that can be seen based on the level of profits obtained by the organization, so that profitability affects the value of the company (Yanti & Darmayanti, 2019). Although, regardless of profit, there is the need to adequately determine the viability, firm size and socio-economic space in which it operates, any entity has to constantly prove its viability, its ability to communicate and adaptability, its economic and financial performance, especially since the market economy mechanisms are formed and work with all the rigors (Al-Kassar, & Soileau,2014). This is actually the area of information ecosystem assessment. Profitability is one of the acceptance of economic performance along with productivity, growth, return investment (Janoskova & Kliestikova, 2018). and also it is one of the expression forms of the economic efficiency of probative synthesis capacity, so it covers all economic-financial aspects of the companies and a benchmark for decision making and guidance of their behaviour" (Imhanzenobe, 2020). In general, financial performance analysis relates to the following aspects: the overall analysis of return based on income statement (through the indicators provided by the intermediary balance sheet), profitability analysis based on rates of return and analysis of financial return Kanakriyah, 2020). The investment activity of the entities we used as a reference and their source of funding (grants).

Information ecosystem needs assessment and Organizational Productivity of Chemical Manufacturing Firms

An Ecosystem Assessment (EA) is a tool that provides information about the state, trend and value of ecosystems and ecosystem services at a specific spatial scale (e.g. at the local authority or county level) and how such services benefit human wellbeing (Shi, 2004). Information needs is primarily used to mean the benefit derived from the information gathered from the environment of business, it seeks to understand how it can improve productivity in

organizations and increase the customers' satisfaction (Sharma, Kuwornu, Datta, Yaseen, & Anal,2020). Over the years, various alternatives to information needs have been proposed as better units of analysis for studying information behaviours. Recently we have seen many scholars arguing that the concept of task is such a better alternative. According to Allen and Helms (2006), productivity is characterized as the rate at which an employer, organization, or country produces items and the amount produced corresponding to the amount of time, effort, and money required to generate them. The ability of humans to join assets like unrefined components, work, abilities, capital, hardware, land, protected innovation, administrative capacity, and monetary funding to create labour and products is known as productivity. A company's prospective success is determined by its organizational productivity, or its capacity to effectively implement methods to meet institutional goals (Randeree & Al-Youha, 2009). Product quality assessment is realized by comparing the results obtained on the basis of concrete measurement of product characteristics, with limits/levels specified in standards, internal notes, specifications or other normative documents (Taufik, Santoso, Fahmi, Restuanto & Yamin, 2022). Regardless of profile, size and socio-economic space in which it operates, any entity has to constantly prove its viability, its ability to communicate and adaptability, its economic and financial performance, especially since the market economy mechanisms are formed and work with all the rigors (Al-Kassar, & Soileau,2014). The investment activity of the entities we used as a reference and their source of funding (grants) explain our inclination towards profitability analysis based on rates of return.

METHODOLOGY

Research Design
The research design adopted in this study was the Cross-sectional design which involves the collection of data from the respondents or the population members. This study is thus structured based on the adoption of the quantitative methodology and thus designed to capture data using the relevant quantitative data generating tools and instruments. It entails data gathering process. There are two study settings namely; the contrived and the non-contrived. The contrived study takes place in a controlled environment such as the laboratory while the non-contrived study takes place in a natural environment where work proceeds. Social sciences research is conducted in a non-contrived setting. There are three units of analysis in social sciences studies; the individuals, groups and the organization. The unit of analysis of this study is the organizational level because data was collected from Directors, Supervisors, Operational managers and System analyst of Chemical firms in Rivers State, Nigeria. Finally, the time horizon is determined between cross-sectional study and the longitudinal study. Descriptive studies are also called observatory research because it establishes only association between variables.

RESULTS AND ANALSYSIS

Descriptive Statistics

Table 1: Respondent rate on Information Needs Assessment

	N	Mean	Std. Deviation
To what extent does your organization recognition of a need for specific information to solve a problem	80	3.288	1.2242
Information need improve organizational productivity	80	3.200	1.1949
How does your see information as a cornerstone of modern civilization on which practically everyone relies.	80	3.200	1.1735
To what extent do you organization consider information in terms behavior of product and services	80	3.125	1.1405
Valid N (listwise)	80		

Source: Research survey, 2024

Table 1 indicated the respondent rate on information needs assessment. Question one showed that the respondents accepted that the organizations recognizes the need for specific information to solve their problem with a mean of 3.29 and standard deviation of 1.2242 and question two showed that the respondents access to information need improve organizational productivity with a mean of 3.30 and standard deviation of 1.1949, question three showed that the respondents information as a cornerstone of modern civilization on which practically everyone relies with a mean of 3.20 and standard deviation of 1.1735 and lastly question four showed that organization consider information in terms behavior of product and services with a mean of 3.12 and standard deviation of 1.1405 respectively. The various items were all above the average of 3.20. These showed the respondents rate were accurate.

Table 2: Respondent rate on Quality Product

	N	Mean	Std. Deviation
The customer are satisfy with the money they spend	80	3.688	1.2788
Products are conformance to requirements.	80	3.713	.9167
Product are smart, simple, measurable, accepted, realistic, temporarily	80	3.888	1.1473
The products are able to influence the preference of the customers	80	3.763	.9174
Valid N (listwise)	80		

Source: Research survey, 2024

Table 2 showed the respondents rate on the quality product delivery. Question one showed that the respondents showed that the customer are satisfy with the money they spend with a mean of 3.69 with a standard deviation of 1.2788, question two showed that the customer are satisfy with the money they spend with a mean of 3.71 and standard deviation of 0.9167, question three showed that the product are smart, **s**imple, **m**easurable, **a**ccepted, **r**ealistic, **t**emporarily with a mean of 3.89 and standard deviation of 1.1473 and question three showed that the products are able to influence the preference of the customers with a mean of 3.76 and

mean of 0.9174. The various mean was all above 3.00 which means that the items were effective.

Table 3: Respondent rate on Profitability

	N	Mean	Std. Deviation
Noticeable increase on income statement	80	4.613	1.0372
Systematic positioning of the enterprise in the strategic	80	3.650	1.2437
Improve level of shareholders	80	4.488	1.0062
Improvement on return on investment	80	4.125	1.3157
Valid N (listwise)	80		

Source: Research survey, 2024

Table 3 showed the respondent rate on profitability. Question showed that the level of profitability is noticeable, that is an increase in profitability with a mean of 4.61 and 1.0372, question two showed that the respondents agree that there is systematic positioning of the enterprise in the strategic with mean of 3.65 and standard deviation of 1.2437, question three showed that there is improve level of shareholders with a mean of 4.49 and standard of 1.0062 and question four showed that the respondents indicated that there is improvement on return on investment with a mean of 4.13 and standard deviation of 1.3157 respectively. The various mean was all above 3.00 which mean that the respondents' rate was above average.

Bivariate Analysis

According to Neuman (2000) cited in Asawo (2009), Scatter graph is one of the techniques used in deciding whether a bivariate relationship actually exist between predictor variable and the criterion variable. Therefore, to determine the trend of the relationship, it is a good decision to plot a scatter chart and find the line of best fit that separate the distribution of dots on the scatter plot. Figure 4.4 showed the relationship between Information Ecosystem Assessment and Chemical Manufacturing Firms in Port Harcourt, Rivers State, Nigeria with the predictor on X-axis and criterion variable on the Y-axis.

0.80 - 1.00   Very Strong relationships

0.60 - 0.79   Strong relationships;

0.40 - 0.59   Average or moderate relationships;

0.20 - 0.39   Weak relationship

0.01 - 0.19   Very Weak or no relationship

Table 4: Relationship between Information Need and Product Quality

			Information Needs	Product Quality
Spearman's rho	Information Needs	Correlation Coefficient	1.000	.964[**]
		Sig. (2-tailed)	.	.000
		N	80	80
	Product Quality	Correlation Coefficient	.964[**]	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Research Survey, 2014

Table 4 showed the relationship between Information need and Product quality of Chemical manufacturing firms in Port Harcourt, Rivers State, Nigeria. The correlation coefficient shows that there is a strong positive relationship between Information need and Product quality of Chemical manufacturing firms in Port Harcourt, Rivers State, Nigeria. The correlation coefficient of 0.964 confirms the magnitude and strength of this relationship which is statistically significant at ($\rho = 0.01 < 0.05$). Based on this value, the null hypothesis **Ho1** was rejected and the research (Alternate) hypothesis **HA1** accepted. Thus, there is a strong positive relationship between Information need and Product quality of Chemical manufacturing firm in Port Harcourt, Rivers State, Nigeria.

Table 5: Relationship between Information Needs and Profitability

			Information Needs	Profitability
Spearman's rho	Information Needs	Correlation Coefficient	1.000	.725[**]
		Sig. (2-tailed)	.	.000
		N	80	80
	Profitability	Correlation Coefficient	.725[**]	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Research Survey, 2014

Table 4.18 showed the relationship between Information need and Profitability of Chemical manufacturing firms in Port Harcourt, Rivers State, Nigeria. The correlation coefficient shows that there is a strong positive relationship between Information need and Profitability of Chemical manufacturing firms in Port Harcourt, Rivers State, Nigeria. The correlation coefficient of 0.725 confirms the magnitude and strength of this relationship which is statistically significant at ($\rho = 0.01 < 0.05$). Based on this value, the null hypothesis Ho2 was rejected and the research (Alternate) hypothesis **HA2** accepted. Thus, there is a strong positive

relationship between Information need and Profitability of Chemical manufacturing firm in Port Harcourt, Rivers State, Nigeria.

CONCLUSON AND RECOMMENDATION

The paper surveyed the concept of Information Ecosystem Assessment and Organizational Productivity of Chemical Manufacturing Firms in Rivers State, Nigeria. It defined Information ecosystem needs as an information tools capable of analyzing the business environment to determine the customers' needs and sources of raw material for manufacturing. The result of the hypotheses tested showed that it enhanced management decision making process and supports the employees for effective used of the organizational resources. The effective implementation of information ecosystem assessment enhanced organizational productivity in terms of quality product and profitability. Therefore, firms in Rivers State that are careful about quality product and profitability should implement the components. This will give the management of the organization better understanding of the business environment that will supports effective and efficient operation or production of quality product and high return on investment or profitability.

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