

Walden University

College of Management and Technology

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Abstract

The Relationship Between Human Capital, Productivity, and Profitability

by

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MBA, Azusa Pacific University, 2006

BS, California State University, Dominguez Hills 1992

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

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Abstract

In the industrial structure of Nigeria, lack of profitability, scarcity of human capital, and low productivity have resulted in the failure of many business organizations. Business leaders must maintain profitability to continue funding their business organizations in the future. Grounded in human capital theory, the purpose of this quantitative correlational study was to examine the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. Archival data records ($N = 836$) between 2005 and 2019 were examined. The overall multiple linear regression model was able to significantly predict profitability: $F(2, 833) = 79.35, p < .01, R^2 = .158$. Human capital was statistically significant ($t = 12.548, p < .01, \beta = .400$); productivity was not significant. A key recommendation for organizational leaders and policymakers in Nigeria is to increase higher education and general knowledge investments to improve the quality of human capital in the country, particularly in the services, construction, and information technology industries. Implications for positive social change include the potential for increased profitability and sustainability of organizations listed on the Nigerian Stock Exchange, which will be better equipped to compete globally through a skilled, well-educated workforce.

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Dedication

I give glory to God for the completion of this doctoral study and dedicate it to my late father, John Nikola Bwire Osogo, a champion for education who died too early to enjoy the fruit of his labor.

Acknowledgments

I am grateful to my husband Matthew, and children Glory, Grace, Angel, and Emmanuel for their faithful support through the completion of this study. I am also grateful to my mentor Dr. Bearden for his unparalleled support toward the completion of this study. I would also like to thank my sister Dolorosa Osogo Odhiambo for her tireless editing assistance, and my sister in love Dr. Akpezi Ogbuigwe for helping pave the way for access in Nigeria.

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Section 1: Foundation of the Study

Leadership that can maintain profitability can continue funding their organizations for the future. Investing in employees can empower the employee toward discretionary effort and innovation that can increase the productivity and profitability of a business. In this quantitative correlational study, I examined the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Background of the Problem

To stay in business for the long run, organizations must be profitable (Sogue & Akçaöz, 2018). Lack of profitability has been a factor in the cessation of 36.9% to 58.3% of businesses in various countries worldwide (Pinkovetskaia et al., 2020). Based on human capital theory, education and training of individuals is key to the collective value of human capital in organizations (Becker, 1962; Schultz, 1961) and can provide a strategic advantage for productivity (Lee et al., 2019). The profitability of organizations listed on the Nigerian Stock Exchange may be negatively impacted by a lack of human capital (Ojo & Akinwumi, 2015), which threatens the sustainability of organizations. Two concerns keep business leaders from maximizing profitability. First, low levels of productivity present significant challenges for organizations (Lee et al., 2019). Nigeria was ranked 152 out of 157 countries in productivity (World Bank, 2020, November 3). Second, accounting for employee costs in the income statement reduces financial statement profits (Akinlo & Olayiwola, 2017; Roslender et al., 2015). Business leaders, who must maintain profitability, may be tempted to keep employee costs down to

stabilize or increase financial statement profits (Mueller, 2019), thereby perpetuating the limitations of available human capital and resulting in a cycle of lower profitability.

Researchers have affirmed a relationship between human capital, productivity, and profitability but rarely tested it empirically (Carlier et al., 2019; Gilbert et al., 2017; Harrell-Cook et al., 2017; Mahoney & Kor, 2015; Rocha et al., 2018; Škuflić et al., 2016). I sought to examine the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. The objective was to give leaders compelling reasons for viewing human capital as an investment in future profitability.

Problem Statement

The knowledge, skills, and abilities transferred within an organization through human capital are crucial to productivity and profitability (Lee et al., 2019). Low levels of tertiary education, such as low high school enrollment rates in Nigeria of 44%, result in low levels of human capital, which can threaten the transfer of knowledge, skills, and abilities in organizations (Danquah & Amankwah-Amoah, 2017; Olopade et al., 2019). Human capital deficiencies in Nigerian organizations are considered a deterrent to profitability (Ojo & Akinwumi, 2015). This has had an impact on Nigeria, which ranked 152 out of 157 countries in productivity (World Bank, 2020, November 3). The general business problem is that low levels of human capital negatively impact the productivity and profitability of an organization. The specific business problem is that some leaders of organizations listed on the Nigerian Stock Exchange may be unaware of the relationship between human capital, productivity, and profitability.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship between human capital, productivity, and profitability. The predictor variables were human capital and productivity. The dependent variable was profitability. The target population for the study were organizations listed on the Nigerian Stock Exchange. This population is appropriate because profitability is analyzed at the organizational level. A lack of human capital in Nigerian organizations can deter profitability and sustainability, thereby impacting the welfare of citizens and the nation (Ojo & Akinwumi, 2015). A labor system that includes the appropriate training of individuals for work promotes the health and well-being of a nation (World Bank, 2019, April 11; Yang et al., 2018). Implications for social change include the potential for increased profitability and sustainability of organizations listed on the Nigerian Stock Exchange through a skilled, productive, well-educated workforce that can support the growth of human capital in the nation.

Nature of the Study

I chose a quantitative methodology for this study. Quantitative research is used to examine relationships among variables, using statistical procedures to analyze data and predict relationships to generalize findings to larger populations (Saunders et al., 2015). Quantitative methodologies follow the rigid requirements of positivist philosophies, which require that other researchers be able to replicate the study. Qualitative studies stem from interpretive researchers who are interested in capturing unique conditions and settings of participants that are ill-adapted to be measured against rigid requirements

(Saunders et al., 2015). A mixed-methods study combines the use of both quantitative and qualitative perspectives (Saunders et al., 2015). The goal of this study was to examine the effectiveness of human capital and productivity in predicting profitability for the stated population and potentially beyond. The study leaned toward the positivist approach that requires the study to be replicable and the approach toward theory development to be deductive for testing human capital theory. Thus, a qualitative methodology and qualitative aspects of a mixed-methods study were inappropriate for this study.

A correlational design was chosen for this quantitative study. Quantitative research designs use inferential statistics to confirm or reject hypotheses (Corner, 2002). The research question drives the choice of the research method used (Smith, 2011). If the purpose of the research question is to determine how much of a change occurs in one variable in relation to another, the choice is a correlation (Smith, 2011). Researchers who ask *what to do* questions use experimental methods that control variables to establish causation (Bleske-Rechek et al., 2015; Smith, 2011). Correlation and causation are similar but not the same (Bleske-Rechek et al., 2015). Correlation examines a change in one variable in relation to another (Saunders et al., 2015), whereas causation examines the cause and effect of one variable on another (Coogan, 2015). Questions that seek to find opinions, beliefs, or preferences not easily obtained in other ways use survey or interview methods (Smith, 2011). The goal of this study was to examine the relationship between human capital, productivity, and profitability for the stated population and potentially beyond. Consequently, a correlational design was appropriate. Because the

required information could be obtained through the website of the Nigerian Stock Exchange, an archival strategy was selected.

Research Question

What is the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange?

Hypotheses

Null hypothesis (H_0): There is no significant relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Alternative hypothesis (H_1): There is a significant relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Theoretical Framework

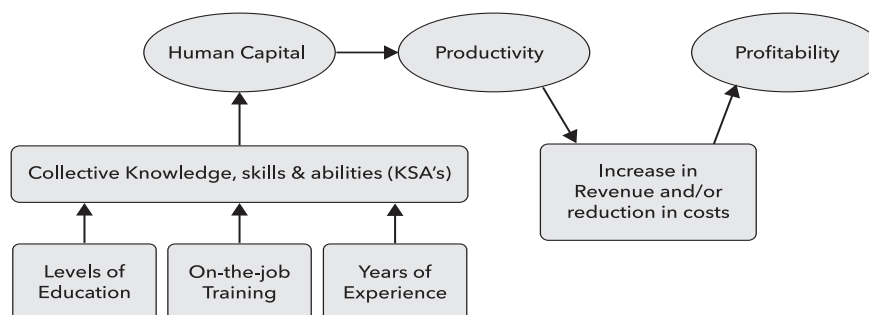
The theory that was used in this study is human capital theory. Good theory describes the nature of relationships among variables and attempts to logically explain why they exist (Saunders et al., 2015). The concepts behind human capital theory have been argued from the days of Adam Smith (Becker, 1962, 1993). However, the theory began to achieve acceptance when seminal authors Becker (1962), Mincer (1958), and Schultz (1961) contributed to the articulation of the theory. Becker formalized human capital theory in business when he argued that investing in human capital can result in labor productivity. Training costs associated with developing employees have economic value that can be considered an investment in organizations (Campbell & Banerjee,

2012). Mubarik et al. (2018) identified education, experience, training, and skills as the top four constructs in the human capital of organizations. In this respect, Schultz (1961) asserted that humans are nothing without knowledge and skills.

The measurement of knowledge and skills is a continuing challenge in human capital theory. Despite concerns, it is possible to measure the collective contribution of all employees in an organization based on their output in the organization (Becker, 1962; Schultz, 1961). Aggregate human capital represents the value of unique knowledge, skills, and abilities of employees in an organization as a group that can enhance productivity (Nyberg & Wright, 2015). As applied to this study, human capital theory holds that the predictor variables, human capital in the aggregate (measured by returns), and productivity (based on the output-based approach), predict profitability. The human capital return on investment (HCROI) measures the profit return on labor costs (Charlwood et al., 2017). The output-based approach measures the output of a group of people (Thamma-Apiroam, 2015) and can help determine profitability (Škuflić et al., 2016). Figure 1 is a graphical depiction of human capital theory as it applies to human capital, productivity, and profitability.

Figure 1

Graphical Depiction of Human Capital Theory



Note. Adapted from the AHP model by Mubarik et al. (2018).

Operational Definitions

Certain terms in this research require explanation. Clarifying the terms can help the reader understand the meaning of each term within the context of the study. Key terms in this research are defined below:

Aggregate Human Capital: The value of unique knowledge, skills, and abilities of employees in the organization as a group that can enhance productivity (Nyberg & Wright, 2015).

Human Capital: The accumulation of individual competencies, skills, and knowledge that can carry out work and produce economic value (Mubarik et al., 2018).

Organizational Performance: The performance of an organization in terms of numbers that can be used to measure important financial metrics such as productivity and profitability (Mueller, 2019).

Productivity: Increases in units of measurement for a particular period with reduced costs (Schiemann, 2009).

Profitability: The ratio of profit earned over the capital expended to earn it (Sogue & Akçaöz, 2018).

Tertiary Education: Higher education (Das & Drine, 2020).

Value: In the context of this study, *value* refers to employees with the potential to influence organizational success (Dayel et al., 2020).

Assumptions, Limitations, and Delimitations

Impediments to the research process must be identified and controlled.

Identification of assumptions, limitations, and delimitations is important to improving the quality, interpretation of evidence, and findings of studies (Theofanidis & Fountouki, 2018). Identifying impediments to the research process involves articulating and clarifying assumptions, limitations, and delimitations to enable readers of the research to understand the constraints and uncertainty within the research.

Assumptions

Beliefs and assumptions concerning what is important guide our decisions.

Assumptions are those facts the researcher considers to be true but cannot verify and that must be scrutinized to avoid bias (Saunders et al., 2015). Assumptions shape the research paradigm (or frame of reference), and the design of research, and lend credibility to the

research philosophy (Saunders et al., 2015). In this research, the website of the Nigerian Stock Exchange helped provide some assumptions about the secondary data. First, that there would be appropriate secondary data on all organizations in the study; that the data would be accurate, and that it would be sufficient. I made careful investigation before identifying and selecting the data source. A scan of information available on the Nigerian Stock Exchange website revealed that the information would be adequate for my purpose. Second, that the instruments used—HCROI, the output-based approach, and return on assets (ROA)—would accurately measure the variables, human capital, productivity, and profitability. The selection of these instruments was based on previous scholarship on organizational performance.

Limitations

Every research method has limitations beyond the control of the researcher that must be addressed to assure the validity of the research. Limitations can impact the ability of the findings in research to be generalized (Saunders et al., 2015) or can cause future research to discredit the validity of the research hypotheses or conclusions (Simon & Goes, 2013). This study was limited to the analysis of human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange, which may not be generalizable to other populations. Second, this study was correlational and not intended to infer causality between the study variables: human capital, productivity, and profitability. Third, the use of secondary data from the Nigerian Stock Exchange may be a limitation, as the primary purpose for collecting the data was different from the purpose of this study. Not every limitation needs to be found and explained; thus, drawing

unnecessary attention to areas that would be unnoticed by a reader (Saunders et al., 2015).

Delimitations

Delimitations are the specific choices made by a researcher, including the choice of the problem, the theory, and the methodology (Simon & Goes, 2013). The scope of this study was limited to aggregate, or collective, human capital that represents all employees in an organization as a group, labor productivity, and profitability. The impact of individual human capital was not assessed. The decision to limit the scope to aggregate human capital was based on the need to maintain the organizational unit of analysis and to limit testing to the impact on the productivity of labor and the organization. Only the productivity of labor in the organization was assessed. The impact of physical labor and other aspects of intellectual labor was not examined. The use of secondary data from the Nigerian Stock Exchange website was chosen as a cost-effective, easily accessible way to achieve the purposes of this study.

Significance of the Study

The findings in this study are expected to heighten awareness of the value of human capital in organizations. Organizational leaders understand that to stay in business for the long run, the organization must be profitable (Sogue & Akçaöz, 2018). Research shows that employees, when treated as valuable human capital, can be an asset that contributes to the profitability of organizations (Mueller, 2019; Smith et al., 2016). Thus, employees who are treated as valuable human capital contribute to the profitability of an organization.

Contribution to Business Practice

Costs associated with employees should be seen as investments that contribute to the productivity and profitability of organizations. In efforts to strive for profitability, organizational leaders may view labor costs as costs that must be minimized (Mueller, 2019). This study is significant because it may provide a practical model for better viewing the relationship between human capital, productivity, and profitability, as seen through the lens of human capital theory. A helpful predictive model that encourages organizational leaders to view costs of hiring and developing employees as investments in future profitability could encourage increased investments in employees. Profitability can be elusive if human capital that can innovate in ways that decrease costs and/or increase revenues sustainably is lacking.

Implications for Social Change

A partnership exists between business organizations, the country, and regional economies to supply a well-educated, skilled workforce that can be further developed for valuable use within an organization. Implications for social change include the potential for increased profitability and sustainability of organizations listed on the Nigerian Stock Exchange. These organizations are better equipped to compete globally with a skilled, well-educated workforce, which can support the growth of human capital in the nation (World Bank, 2019, April 11).

A Review of the Professional and Academic Literature

In this quantitative, correlational research study, I examined the profitability of organizations listed on the Nigerian Stock Exchange with regards to the relationship

between human capital, productivity, and profitability. The study was based on human capital theory. Human capital theory holds that the mix of collective knowledge, skills, and abilities obtained by an organization based on levels of employee education, on-the-job-training, and job experience can result in productive individuals who innovate and correctly apply technology for increased organizational revenue and decreased expenses (Becker, 1962; Benos & Karagiannis, 2016; Danquah & Amankwah-Amoah, 2017; Schultz, 1961). Profitability results when an organization can increase revenue without increasing expenses, maintain revenue levels while decreasing expenses or increase revenue while decreasing expenses. Studying the correlation between human capital, productivity, and profitability may help leaders of organizations listed on the Nigerian Stock Exchange improve productivity for greater profitability.

Literature Search Strategy

The following literature review consisted of an in-depth inquiry based on critical analysis and synthesis of various literature, including journals, reports, and seminal sources. The criteria for inclusion were empirical studies in the organizational performance field, human capital at the organizational level, and on productivity and profitability. Primary sources in this literature review were peer-reviewed articles from the Walden University library database search engine: ABI/Inform Collection, Business Source Complete, Emerald Insight, Lexis Uni, PsycINFO, Sage Journals, and Science Direct. Keywords used in the search included *human capital*, *human capital theory*, *productivity*, *Nigeria*, *profit*, *profitability*, *determinants of profitability*, *constructs in profitability*, and a combination of the terms. I captured a total of 133 sources including 4

dissertations, 16 books, and 13 websites (105 sources were within the last 5 years and 100 were peer-reviewed).

In this literature review, I discuss the application of human capital theory to the applied business problem: The relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. I begin the review with an introduction to the purpose of this study and the hypothesis. A critical analysis of the literature addressing the theoretical framework follows, along with a discussion of supporting and contrasting theories, and a discussion of the measurement of the variables, human capital, productivity, and profitability. Next is a critical analysis of the literature about the human capital variable with a focus on aggregate human capital. The critical analysis of the productivity variable addresses the business environment in Nigeria. A critical analysis of profitability ends the analysis of literature for the variables. The literature review ends with a discussion of methodologies previous researchers have used to address profitability followed by a summary and transition.

Application to the Applied Business Problem

Purpose

The purpose of this quantitative correlational study was to examine the relationship between human capital, productivity, and profitability. The predictor variables were human capital and productivity. The dependent variable was profitability. The target population for the study was organizations listed on the Nigerian Stock Exchange. This population is appropriate because profitability is analyzed at the organizational level. A lack of human capital in Nigerian organizations can deter

profitability and sustainability, thereby impacting the welfare of citizens and the nation (Ojo & Akinwumi, 2015). A labor system that includes the appropriate training of individuals for work promotes the health and well-being of a nation (World Bank, 2019, April 11; Yang et al., 2018). Implications for social change include the potential for increased profitability and sustainability of organizations listed on the Nigerian Stock Exchange through a skilled, productive, well-educated workforce that can support the growth of human capital in the nation. To examine these claims, I selected a target population of organizations listed on the Nigerian Stock Exchange, and formulated the following hypotheses:

Null hypothesis (H_0): There is no significant relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Alternative hypothesis (H_1): There is a significant relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Theoretical Framework

In this quantitative correlational study, I examined the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange and attempted to logically explain the relationship through the lens of human capital theory. Theories describe the nature of relationships among variables and attempt to logically explain why they exist (Saunders et al., 2015). Based on human capital theory, the collective knowledge, skills, and abilities obtained through education,

on-the-job-training, and job experiences can result in productive individuals who innovate and correctly apply technology for profitability—that is, increased organizational revenue and decreased expenses (Becker, 1962; Benos & Karagiannis, 2016; Danquah & Amankwah-Amoah, 2017; Schultz, 1961). Understanding the relationship between human capital, productivity, and profitability may help leaders of organizations in Nigeria improve productivity for greater profitability.

I used human capital theory to explain the relationships among the variables: human capital, productivity, and profitability. The human capital construct spans various disciplines at the individual, national, and organizational levels (Boon et al., 2018). The chosen focus for studies in human capital has a wide range of interdisciplinary subjects and significant depth based on the level of the chosen study (Boon et al., 2018). In studying the relationship between human capital, productivity, and profitability, I attempted to bring together various disciplines, including accounting, education, economics, human resources, management, psychology, and social science. Bridging the gap among disciplines can be challenging (Nyberg & Wright, 2015). Discussions on human capital were found in every one of the stated fields, while discussions on productivity were generally found in the economics and management literature, and discussions on profitability were found in the accounting and economics literature. Given that human capital was represented in all the stated fields of discipline, I examined the research question through the lens of human capital theory.

Human Capital Theory

Human capital theory achieved acceptance when seminal authors Becker (1962), Mincer (1958), and Schultz (1961) contributed to the articulation of the theory. Mincer (1958) struggled with the formation of a theory that could explain income inequality, suggesting that the conversation around a theory of personal income distribution needed to begin by exploring the implications of rational choice theory. Rational choice theory is from the neoclassical school of thought, in which scholars believe that individuals choose the path that maximizes their economic interests (Tan, 2014). The assumptions by researchers in rational choice theory mean that the present value of an individual's lifetime earnings when they make an occupational choice is equalized with others when higher pay is attributed to those who receive more training (Mincer, 1958). The loss in earnings experienced while individuals who take longer to educate and train means higher future earnings (Mincer, 1958). In this respect, Mincer (1958) articulated a model that aligns with human capital theory from an individual perspective but failed to articulate the theory itself.

Schultz (1961) did not articulate the theory of human capital as a construct but discussed a theory of investments in human capital. Schultz referred to skills and knowledge as *useful*, saying that it is unapparent to people when they obtain knowledge and skills that they are establishing a form of capital. Investments in human capital explain consumption, which includes expenditures for better opportunities through education (Schultz, 1961). Foregone earnings by students who could be working but are still in school or undertaking on-the-job training are included in these expenditures

(Schultz, 1961). Consequently, dispersion in income is positively related to investments in human capital, and differences in earnings can be attributed to differences in education and training (Becker, 1962, 1993; Mincer, 1958; Schultz, 1961). The knowledge, skills, and experience obtained by an individual can be used to explain differences in earnings. Higher earnings accrue through human capital to those who take longer to educate and train (Becker, 1962; Mincer, 1958). This view of the impact of education and training on earnings was shared by Becker (1962) and Mincer (1958). People invest time and money in education and training to establish value that can be used to earn more money. This value is the individual human capital that can bring value to an organization.

Becker (1962) articulated the theory as human capital theory, defining it as the experience, skills, and knowledge that can accumulate to become sustainable capital stock. *Capital stock* represents the returns on human capital that can be observed in the form of earnings (Becker, 1962). As a result of the investments in education, individuals can achieve greater productivity in organizations, earn more money for their families, and build stronger economies. The main point of the theory is that there is value in investing in education and training from an individual, organizational, and national perspective.

Initially, not everyone agreed with the view of labor as human capital. Scholars in economics were concerned about the term *capital* being used for human beings (Robinson, 1919). Deep-rooted concerns from a moral and philosophical perspective were expressed about the subject of investments in human beings as capital, causing researchers to shy away from the subject (Schultz, 1961). Concerns that some might interpret the term as *slavery* made it inappropriate for a free society of human beings to

use the word *capital* for humans (Spengler, 1950). *Capital* was a term reserved for nonhuman capital employed by humans (Spengler, 1950). Schultz (1961) refuted these arguments by claiming that, unlike slaves, human wealth (or capital) does not exist just for the benefit of others.

Human capital is illiquid and cannot be sold or used as collateral for loans (Becker, 1962; Goode, 1959; Moes, 1961). People voluntarily invest in themselves (Schultz, 1961). Unlike physical capital, which remains with the buyer, investments in human capital are a true gift that is transferred to and remains with, the individual being trained (Schultz, 1961). Researchers eventually began to accept human capital as potentially valuable, and the concept became less controversial (Schultz, 1961). Human capital theory survived, strengthened, and expanded to other disciplines, including education, psychology, sociology, and management (Tan, 2014). In fact, Becker subsequently won the Nobel Prize in economics for his contribution to human capital theory.

Human capital theory is applicable at the individual, organizational, and national levels. Thus, implications can be made at the individual (or micro) level or the group (or macro) level (Becker, 1993). Micro research involves the study of individual development and value (Nyberg & Wright, 2015). Micro research makes implications that involve individual development and value. The purpose in the study of individual development is not to determine positive organizational outcomes (Delery & Roumpi, 2017). Macro research, on the other hand, is the study of the aggregate value of all individuals within an organization or nation (Delery & Roumpi, 2017). In their studies,

Mincer (1958) and Schultz (1961) focused on the micro impact of human capital in economic growth. For example, Mincer (1958) focused on the impact of income inequality on the earnings of individual workers. Becker (1962) focused on the macro impact of human capital in organizations.

Human capital within an organization is a part of a larger whole that includes the individual, the nation, markets, industries, and the organizations within industries. Schultz (1961) provided perspective on the environment in which markets compete when he argued that the most important feature of an economic system is the growth of its human capital. A country's wealth depends on the people within it (Schultz, 1961). Schultz argued that tax laws, which tend to be blind to human capital in favor of physical capital, be reformed along with banking laws, to support increases in human capital through widely available school loans. Investment in depressed groups, such as immigrant farmworkers and blacks, was needed (Schultz, 1961). Racial discrimination hinders depressed groups from choices of professions like medicine, which makes richer forms of human capital more difficult for individuals in these groups to acquire (Schultz, 1961). Schultz appealed for help on behalf of underdeveloped countries, where investments in human capital are more likely to be underrated and neglected.

Knowledge and skills are needed in underdeveloped countries for superior techniques in production (Schultz, 1961). For these countries, the rate of growth is severely limited if physical assets do not match the knowledge and skill required to operate them (Schultz, 1961). Schultz's arguments provided perspective to the role of

governments and political establishments in developing human capital for the markets within countries.

Education and training that is useful to organizations can be obtained through schooling at the national level and through on-the-job training at the organizational level (Becker, 1962). Becker asserted that this value represents the experience, skills and knowledge of human capital that can accumulate to become sustainable capital stock and represents the collective, or aggregate value of human capital in an organization. This value can be observed when goods and services are produced by human capital (Danquah & Amankwah-Amoah, 2017) and released through profits that are realized when the goods or services are sold.

The hope within organizations is that training individuals can bring productive value to the organization. Mincer (1958)'s focus was on the training of individuals. In agreement with Becker (1962) and Schultz (1961), Mincer asserted that the training of individuals results in valuable skills. All things being equal, differences in the earnings of individuals represent their choice of occupation as well as the length of their training. If everyone starts at the same place, different occupations require different amounts of training. The longer the training, the longer earnings are postponed, thereby shortening the span of lifetime earnings an individual can earn (Mincer, 1958). Individuals in occupations with longer periods of training can expect to earn more when they are eventually employed in organizations (Mincer, 1958).

Organizations in Nigeria, a developing country in sub-Saharan Africa, are limited to the individual human capital available within the country. Countries in sub-Saharan

Africa have the lowest levels of educational attainment, with average years of schooling lagging behind developed and emerging nations (Das & Drine, 2020). On average, schooling in developing nations in sub-Saharan Africa is at the basic level (Danquah & Amankwah-Amoah, 2017). High school enrollment rates in Nigeria are 44% (Olopade et al., 2019). For those who go further, Nigerian universities are crippled by factors such as poor funding, substandard facilities, and performance (Salau et al., 2016). This lack of investment in education contributes significantly to poverty rates of more than 20% in Nigeria (Olopade et al., 2019). Danquah and Amankwah-Amoah (2017) found productivity in sub-Saharan African countries to be negative. The productivity of a nation is reflected in the productivity of organizations within the nation.

Becker (1962) focused on the value of human capital in organizations. By investing in appropriate human capital, organizations can be more productive (Becker, 1962). Investments in formal education and on-the-job training are the essence of human capital in organizations (Becker, 1962; Goode, 1959). A lack of investment in education and training can have a profound impact on productivity. One of the most important distinctions in human capital analysis is the distinction between general and firm-specific knowledge (Becker, 1962). General knowledge relates to formal education, while firm-specific knowledge relates to on-the-job training (Becker, 1962). Becker articulated two types of general knowledge in an organization: (a) general knowledge that can be obtained independently by an individual and, (b) general knowledge that an individual obtains through an organization. General knowledge is useful across organizations, as it is marketable to other organizations (Becker, 1962). Consequently, individuals are

willing to pay for this type of knowledge (Becker, 1962). On the other hand, firm-specific knowledge is useful to the organization providing the training (Becker, 1962). Thus, organizations are more willing to pay for firm-specific training (Delery & Roumpi, 2017).

Although all training is valuable to organizations, firm-specific training, which maximizes an individual's value to the organization, makes more sense for investment by organizations. On-the-job-training increases firm-specific skills and the marginal productivity of organizations, making firm-specific skills valuable to organizations (Becker, 1962). Marginal productivity represents the increase in units produced by human capital without corresponding increases in costs. In a competitive market, improving general skills increases marginal productivity across all relevant organizations (Becker, 1962). To obtain value from the industry-wide increase in marginal productivity, the organization's productivity must increase more than its wages (Becker, 1962). The organization is only profitable if future organizational revenues increase and/or future expenses decrease (Becker, 1962). As a result, it does not make sense for organizations to pay for general skills. General skills make individuals marketable across organizations and increase flight risk (Becker, 1962). Thus, individuals need to invest in themselves where general education is concerned (Becker, 1962).

The goal behind the productive value of each individual, or individual human capital, is to facilitate profitability for the organization. Human capital theory holds that education and training are the keys to value in organizations (Becker, 1962; Schultz, 1961). The knowledge, skills, and abilities (KSA's) of individuals, which are developed

through education, on-the-job training, and work experience combine to form human capital that can bring value to an organization through productivity and profitability. However, the link between investments in employee training and development and financial benefits for the organization is not always apparent (Mueller, 2019).

Training costs money, which includes the opportunity cost of employees not producing current value (Becker, 1962). From an organizational perspective, investments in training can lower current revenues and increase current expenditures (Mincer, 1958). Lower revenues and increased expenditures may cause organizations to view human capital expenditures as costs that must be minimized. In this respect, leaders of organizations listed on the Nigerian Stock Exchange may hesitate to move critical resources to employee development. Yet, human capital deficiencies in organizations deter the profitability and sustainability of organizations in Nigeria (Ojo & Akinwumi, 2015), thereby establishing a cycle of lower profitability. Training and development of employees can address human capital deficiencies and enhance the productivity, profitability, and sustainability of the organizations.

The importance of human capital productivity in organizations cannot be overestimated. Schultz (1961) suggested that organizational leadership measure productivity based on the contribution of all human capital to the output of the organization. This was in line with human capital theory, which involves all the experiences of employees that can enhance productivity (Adom & Asare-Yeboar, 2016). A lack of positive impact by individuals in institutions in the sub-Saharan African country of the Democratic Republic of Congo (DRC) was a significant impediment to

productivity (Lufungula & Borromeo, 2019). Institutions failed because of conflicts, errors, mistakes, fraud, and theft (Lufungula & Borromeo, 2019). Furthermore, the institutions suffered from waste, duplication of systems, inefficient use of the workforce, and supply chain inefficiencies (Lufungula & Borromeo, 2019). Lufungula and Borromeo recommended that hospital administrators leverage human capital for organizational success. Improvements would be difficult without the ability to measure the productivity of human capital in the organizations (Lufungula & Borromeo, 2019).

The level of productivity of human capital in an organization depends on the quality of the human capital within the region's markets. Productivity growth is driven by innovation (Danquah & Amankwah-Amoah, 2017). The ability to deploy human capital in creating innovative conditions that develop new business is critical if human capital is to have a profound effect on production processes and results (Danquah & Amankwah-Amoah, 2017). Sub-Saharan Africa needs to increase investments in higher education to build skills for innovation (Danquah & Amankwah-Amoah, 2017). More people are trained at the basic levels of education in sub-Saharan African nations, than at the higher levels of education, which hinders productivity growth (Danquah & Amankwah-Amoah, 2017). Innovation is skill-intensive and requires higher levels of education (Danquah & Amankwah-Amoah, 2017). However, highly educated Nigerians often seek employment overseas due to poor work environments and infrastructure in the nation (Salau et al., 2016). The *brain drain* means that innovation is accomplished abroad where Nigerian organizations and the country receive a minimal benefit.

The goal of human capital in a nation is to train individuals to learn and develop skills for use in employment within the organizations in the country. Organizations hire them, further train them to work in the organization, and attempt to retain them, as their collective knowledge, skills, and abilities are maximized, for productive and profitable operations. This perspective was echoed by various researchers in the literature, using various theories, which either supported or contradicted human capital theory.

Supporting and contrasting theories.

Social exchange theory (SET) was highlighted as a potentially better theory for employee development than human capital theory. King (2016), argued against human capital theory in favor of SET, saying that SET better-supported employee development. Human capital theory discourages training due to the possibility of increased turnover, while SET garners employee loyalty through investment in the training of employees (King, 2016). There are two potential problems with this view, the author assumed that: (a) loyalty to the organization that contributed to the employee's development would take precedence over increased earnings elsewhere by the individual, and (b) profitability was of little importance to organizational leaders. King may have been referring to investments by organizations in general human capital. Becker (1962) agreed with this view on general human capital and argued that investing in firm-specific human capital is more likely to result in the profitability of organizations compared to general human capital.

Firm-specific human capital provides a strategic advantage for enhanced performance within an organization, while general human capital increases value (or

marginal productivity) across all relevant organizations (Becker, 1962). The essence of human capital theory is the development of employees toward the productivity of an organization. The development of employees in SET is based on the social exchange between employers and employees (King, 2016), rather than the profitability of organizations. Hence, SET was inappropriate for this study.

Delery and Roumpi (2017) highlighted the resource-based view (RBV) as a theory that can bridge the gap between micro and macro research. Micro research focuses on individual value, while macro research focuses on collective value (Nyberg & Wright, 2015). Micro research addresses the earnings of individuals within the organization, while macro research addresses the value added by individuals as a group, to a nation or organization. If the collective human capital in an organization is greater than the individual output, human capital is present in the organization and can be leveraged for competitive advantage (Delery & Roumpi, 2017). Based on the RBV, organizations that can control scarce resources, which cannot be substituted by the competition, experience superior returns, and a sustainable competitive advantage (Lewis & Kipley, 2012). Although human capital theory and the RBV are both focused on creating a sustainable competitive advantage for the organization, the RBV has a broader scope. The RBV includes human, physical, and organizational assets (Jogaratham, 2017; McCoy et al., 2019).

The theory of dynamic capability (DC) extends the discussion on the RBV to include the evolving internal and external competencies of an organization and how they can be developed and established in rapidly changing environments (Lewis & Kipley,

2012). The emphasis in RBV is on the selection of appropriate resources, while the emphasis in DC is on the development and renewal of resources (Lewis & Kipley, 2012). The emphasis in this study is on the selection, development, and effective deployment of collective human capital. Thus, the scope of RBV is too wide and the scope of DC is too narrow for use in this study.

Labor process theory and signaling theory are opposed to human capital theory. Labor process theory holds that people are in control of their own lives and should not be viewed at the same level as physical assets (Salau et al., 2016). It is demeaning to view people as passive assets that can be bought, sold, or replaced (Salau et al., 2016). Becker (1993) refuted this view when he won the Nobel Prize in economics for his work on human capital theory. Signaling theory holds that more education does not necessarily mean higher productivity for organizations. According to signaling theorists, there is no correlation between education and productivity (Tan, 2014); education is innate and comes from intelligence and commitment (Tan, 2014). Based on signaling theory, the signaling effect can be seen in the initial hiring decision, and productivity can be predicted from innate characteristics (Tan, 2014). After hiring, productivity is determined over time, which rather than education, is the cause for increased wages (Tan, 2014). Various researchers refuted this view by defining human capital as *productive* (de Grip et al., 2020; Molloy & Barney, 2015; Russell & Taylor, 2017). Total factor productivity improves when organizations invest in training employees (Carrier, et al., 2019; Rocha et al., 2018). Tan (2014) concluded that human capital theory will remain popular because it generally predicts behavior.

Some assumptions in human capital theory provide limitations. For example, the benefits that accrue from the value of human capital depend on the type of human capital and the labor market pool (Molloy & Barney, 2015). In a competitive labor market, individuals have the advantage and can benefit from their general human capital while sharing their firm-specific human capital with the organization (Molloy & Barney, 2015). Bargaining power between the employer and employees is needed in less competitive markets (Molloy & Barney, 2015). Thus, as noted by King (2016), the organization does not always benefit from the training of individuals. Organizations have limited ability to control the movement of individual human capital. Individuals are free agents who can choose where to invest their talent and resources (Salau et al., 2016). Another limitation is the assumption that the present value of lifetime earnings is equalized when the choice of occupation is made, or that occupations that have longer training result in a shorter work-life but garner higher earnings (Mincer, 1958). These assumptions present challenges in the measurement of human capital.

Measurement

Measurement is the process of attempting to discover the dimensions, extent, capacity, or quantity of something compared to a standard (Cooper & Schindler, 2014). Quantitative researchers hypothesize that certain conditions exist, then proceed to measure them to support or refute a hypothesis (Cooper & Schindler, 2014). Variables operate at the individual, group, or unit level, and the conclusions drawn at one level may not apply to another. The purpose of this study was to examine the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian

Stock Exchange. The unit of analysis selected for this study was organizations because profit is analyzed at the organizational level. All three variables, human capital, productivity, and profitability were analyzed at the organizational level. Accordingly, any generalizations were made at the organizational level.

Measurement of Human Capital. Human capital is the first predictor variable in this study. Researchers have not agreed with regards to methods for measuring human capital (Kucharčíková et al., 2018). Surveys have most often been used (Amodu et al., 2017; Dalayga & Baskaran, 2019; de Grip et al., 2020; Lara & Salas-Vallina, 2017; Ogunyomi & Bruning, 2016; Okafor et al., 2019; Salau et al., 2016; Samagaio & Rodrigues, 2016; Yeswa & Ombui, 2019). These surveys have generally been based on individual human capital. Data in these cases have most often been categorical, such as years of experience, levels of education, and degree level (Hayek et al., 2016; Thamma-Apiroam, 2015). Thamma-Apiroam used the following formula for the output-based approach:

$$H = \sum L_i N_i$$

Where H represents human capital, L represents the labor force at a particular level of education, and N represents the number of years of education for a particular level of education. Although the availability of data, ease of measurement, and proper interpretation of the data are effective counters, school enrollment did not necessarily equate to capital stock (Thamma-Apiroam, 2015). Additionally, measurement error can result when dealing with international data due to differences in aggregation (Thamma-Apiroam, 2015).

To answer the research question in this study, I selected the human capital return on investment (HCROI) model to measure aggregate human capital. Calculations of aggregate human capital account for enterprise-level aspects as an input of the organization (Kucharčíková et al., 2018). Using a hypothetical company, Fitz-Enz (2009) discussed an enterprise-level metric that could calculate HCROI to examine the relationship between investments in human capital and profitability (DiBernardino, 2014; Fitz-Enz, 2009). From an organizational perspective, examining inputs based on outputs can provide insight into returns from the inputs. Raghubeer (2018) used HCROI to examine the relationship between human capital effectiveness and financial performance and found a correlation between ROA and HCROI. Kucharčíková et al. (2018) used the HCROI model to evaluate the effectiveness of human capital investment in an e-business context. By deducting pay and benefits from expenses and revenue in the numerator, and dividing the result by pay and benefits, profit per unit invested in human capital could be accounted for (Fitz-Enz, 2009). Data collected for the human capital variable are based on a numerical, ratio scale of measurement.

Measurement of Productivity. Productivity is the second predictor variable in this study. Productivity is the measure of an organization's effectiveness in transforming inputs into outputs (Kämäräinen et al., 2016; Russell & Taylor, 2017; Thamma-Apiroam, 2015). Productivity is calculated based on the ratio of outputs to inputs. Outputs can be expressed in the form of units (such as the number of units produced, the number of patients seen, or the number of customers served) and compared to a single factor input (such as labor), or multiple factor inputs (such as labor, materials, and overhead) (Russell

& Taylor, 2017). The more outputs that can be generated from inputs, the greater the productivity (Price, 1997). Conversely, the fewer inputs needed to generate a given level of outputs, the greater the productivity (Price, 1997). Increased productivity is achieved when inputs decrease, and outputs increase. The measurement of productivity can be classified as operational performance in contrast to the measurement of profitability, which is classified as financial performance (Kuncová et al., 2016). Data collected for the productivity variable are based on a numerical, ratio scale of measurement.

Measurement of Profitability. Profitability is the dependent variable in this study. Profitability is the financial performance that results from efficient organizational operations (Russell & Taylor, 2017). Researchers measured the financial performance of organizations using the return on assets (ROA) calculation as the measure for profitability (Işık, 2017; Kuncová et al., 2016; Nanda & Panda, 2018). ROA goes further than simply looking at the profit measure, by accounting for differences in the size of organizations (Kuncová et al., 2016). ROA is calculated by dividing profit before interest and taxes (EBIT), by total assets (Kuncová et al., 2016). Higher ratios mean better organizational outcomes and continued sustainability for organizations. ROA was used to assess the profitability of organizations in this study based on a numerical, ratio measurement scale.

Studies in profitability were generally industry-wide, which highlighted the importance of the industry (or markets) an organization operates in. The environment in which an organization operates is similar for competing firms (Rizea, 2015). Porter (2008) argued that profitability could be measured based on return on invested capital (ROIC) to account for the required capital. Earnings before interest and taxes were

divided by average capital invested and excess cash deducted to account for differences in capital structure and tax rates across organizations and industries. Thus, the economic strength of organizations was more effectively measured against competitors in its industry (Rizea, 2015). Porter's measure was designed for physical capital and was not considered for this study.

Human Capital

Human capital is a diverse subject that is studied at the individual, national, or organization level. Human capital is defined as the accumulation of competencies, skills, and knowledge that can carry out work and produce economic value (Mubarik et al., 2018). Accumulation of human capital results in the value that can be seen at the individual and the aggregate, or national and organizational levels. Thus, implications in human capital can be made at the individual or aggregate levels. The focus of individual human capital is to assess career success, including pay and promotions (Hayek et al. (2016). The purpose of studying human capital in organizational performance is to determine the collective, or aggregate value of employees to an organization (Nyberg & Wright, 2015). Aggregate human capital can be said to consist of the collective knowledge, skills, and abilities of all employees within an organization.

In this study, I examined aggregate human capital. In line with human capital theory, Mubarik et al. (2018) identified education, experience, training, and skills as the top four constructs for human capital in small and medium-sized entities (SME's). A lack of investment in education in Nigeria contributed to low human capital and high poverty rates (Olopade et al., 2019). Schooling on average in developing nations in sub-Saharan

Africa is at the basic level (Danquah & Amankwah-Amoah, 2017). As a result, human capital, particularly aggregate human capital, is urgently needed in sub-Saharan Africa and in organizations in Nigeria.

With increased human capital, organizations in Nigeria can leverage the knowledge, skills, and abilities of employees to enhance organizational performance. Aggregate human capital represents the value that, based on the unique knowledge, skills, and abilities of all employees in an organization, can potentially provide sustainable competitive advantage through productivity and profitability (Nyberg & Wright, 2015). Although individual employees bring value to organizations with their knowledge, skills, and abilities, it is the aggregate value of all these employees that has the potential to create a sustainable competitive advantage (Blanco-Mazagatos et al., 2018); Delery & Roumpi, 2017). Thus, examining employees from an aggregate perspective can encourage organizational leadership to view investments in employees as a way of enhancing capital (McCoy et al., 2019). Organizational leadership that views employees as valuable resources can leverage the knowledge, skills, and abilities of the employees to create a profitable organization.

Leveraging the knowledge, skills, and abilities of employees in an organization requires a distinction between general and firm-specific knowledge (Becker, 1993). General human capital is obtained throughout an employee's life (Rocha et al., 2018) and is useful across organizations (Becker, 1993). General knowledge provides value and employability for the individual employee (Bode & Perez Villar, 2017). Individual human capital are free agents, who can choose where to invest their talent (Salau et al.,

2016). While organizational leadership can choose to provide general knowledge to employees, it is firm-specific knowledge that carries the most value for an organization. Firm-specific knowledge is obtained within an organization over time and includes knowledge of the company culture, as well as knowledge of the company's unique resources, which are useful only to the specific organization (Becker, 1993; Mahoney & Kor, 2015; Rocha et al., 2018). Firm-specific knowledge is not easily transferable to other organizations (Delery & Roumpi, 2017). Organizations that engaged in proper job-crafting, appropriate hiring of individuals with the right general knowledge, skills, and abilities for the jobs, and training of employees in firm-specific knowledge experienced greater employee retention and better organizational performance (Ju & Li, 2019; Yeswa & Ombui, 2019). For organizational leaders to willingly invest in employees, clarity is needed on the collective impact of the knowledge, skills, and abilities of employees on organizational performance.

Perhaps due to the diversity of the subject, constructs, and concepts in human capital were not always easily decipherable. Human capital was conceptualized as a valuable organizational resource, or internal capability (Zouaghi et al., 2018). Human capital was described as an active enterprise that could be assessed for benefits over costs, to maximize utility (Tan, 2014). Researchers used the term *human capital* to mean the value of an individual's knowledge, skills, and abilities (Gilbert et al., 2017; Hayek et al., 2016; Molloy & Barney, 2015). Other researchers used the term to mean the collective knowledge, skills, and abilities of all employees in an organization (Nyberg & Wright, 2015). Nyberg and Wright (2015) conceptualized knowledge, skills, and abilities

as value, while other researchers referred to human capital as added value (Gilbert et al., 2017; Molloy & Barney, 2015). These interpretations could be taken to mean that the value obtained through additional knowledge, skills, and abilities was added to the knowledge, skills, and abilities residing within human capital, to increase value.

The terms associated with human capital were not always clear. Some referred to human capital as productive value (Molloy & Barney, 2015; Russell & Taylor, 2017), or a resource for competitive advantage (de Grip et al., 2020; Salau et al., 2016; Tan, 2014). The hiring, developing, training, managing, rewarding, and retaining of employees was referred to as human capital management (HCM) (Salau et al., 2016), or as human resource management (HRM) (Carlier et al., 2019; Chapman, et al., 2018; Schiemann & Seibert, 2017). The term *human resources* was not considered synonymous with human capital. The term *assets* was used interchangeably with the term *capital* (McCoy et al., 2019). The potential to arrive at different, even opposing views when concepts are unclear is high, and consensus can be at best, difficult (Nyberg & Wright, 2015). What was clear, whether potential, latent, or apparent, is that human capital has value.

There is a difference between labor and capital. Robinson (1919) distinguished capital from labor by saying that labor is in search of wages, while capital is in search of work. As individuals put their heart and soul into their work, they produce income, which is used to pay their wages (Robinson, 1919). Employees who can produce more income highlight the importance of capital. The number of wages paid is based on factors that include bargaining power between employees and their employers (Robinson, 1919). Productive capital produces a surplus (Robinson, 1919). The world's human capital,

obtained from a surplus and used wisely through hard work, is what has made life easier for humanity in the long run (Robinson, 1919). For example, numerous inventions have stemmed from the availability of electricity (Tejvan, 2015, April 5). We cannot imagine life without electricity. Thanks to Thomas Edison and other scientists, many inventions, such as industrial machinery that have made work easier might not have been possible (Tejvan, 2015, April 5). The internet revolutionized the way we do business and continues to be relevant through the impact of Covid-19 as employees work productively online from home. Ultimately, it is the money obtained from these inventions that represents value (Robinson, 1919). Like lending money to a bank, if consumption maintains the pace of production, there is no progress (Robinson, 1919). However, if there is a surplus of money, fresh capital has been added for increased value (Goode, 1959; Robinson, 1919). This surplus represents profits (Robinson, 1919). Unlike labor that is looking for wages, human capital has productive value that can be used to generate profits for increased capital.

Human capital is different from other forms of capital. First, individuals are free agents who can choose where to invest their talents and resources (Salau et al., 2016), while physical and intellectual capital (such as patents) are at the disposal and control of organizational leadership. Second, human capital is excluded from the capital in the balance sheet in favor of expensing of personnel costs in the income statement (Akinlo & Olayiwola, 2017; McCoy et al., 2019). This practice reduces profits in the period of operations, rather than increasing capital for that period. If included in the balance sheet, capitalization of personnel costs would be amortized over time to account for the value of

human capital in the organization. Third, human capital differs from financial capital due to the impact on turnover, organizational culture, and training (McCoy et al., 2019). The human resources (HR) department is tasked with managing the flow and impact of turnover, organizational culture, and training in an organization.

Human resources (HR)

The focus for the HR department is on: (a) reducing turnover, thereby increasing retention; and (b) measuring human capital (Tan, 2014). Through appropriate hiring, training and development, and measurement of human capital, HR can enhance the human capital of an organization (Blanco-Mazagatos et al., 2018; Delery & Roumpi, 2017; Schiemann et al., 2018). In this respect, HR is tasked with reducing turnover costs in the organization. Reduction in costs, assuming revenues remain constant, is a key element for increased profitability. Reduction in costs requires effective use of data (Cokins & Scanlon, 2017). Additionally, managing costs requires an understanding of the human capital in the organization. Three metrics serve as important indicators of productivity in human capital across organizations: (a) absenteeism, (b) turnover, and (c) employee engagement (McCoy et al., 2019).

Absenteeism. Absenteeism significantly impacts productivity. Lower absenteeism indicates higher productivity among employees (McCoy et al., 2019). This is because coverage for missing employees produces inefficiencies when employees with less experience are used, or the work is distributed among fewer employees. Unwell employees cannot properly engage with work and have a reduced capacity for value creation (Roslender et al., 2015). Furthermore, absent employees receive wages for

unproductive work, with a potentially negative impact on profitability. Interventions in European organizations, which included skill development, resulted in reduced absenteeism (Bakker, 2017). Ju and Li (2019) found that employee training and education were positively associated with employee retention. Thus, an important role of the HR department in managing costs is to track productivity by reviewing rates of absenteeism.

Turnover. Turnover is an important subject in human capital theory (Becker, 1962). Low investment in training negatively impacted productivity and increased turnover in Brazilian manufacturing firms (Rocha et al., 2018). To reduce turnover, organizations need to invest in the training and education of employees, while keeping in mind that general education can result in turnover and loss, as the value of an employee increases across organizations (Becker, 1962). Salau et al. (2016) called this movement of human capital *brain drain*. Tanzania experienced an 87.5% shortage in private healthcare institutions as 38.1% of health care workers who completed their studies left the country for overseas employment (Lufungula & Borromeo, 2019). Thus, leaders of organizations were advised to hire employees with appropriate levels of general education and pay for the needed firm-specific training (Becker, 1962; Ghorbannejad, & Esakhani, 2016). Firm-specific training is the key to reducing turnover because firm-specific training meets the specific needs of the organization, making it difficult for employees to transfer the skills elsewhere.

To mitigate these and other human capital concerns, researchers for organizations create human capital data analytics tools. To measure human capital, Nicolaescu et al. (2019) created a human capital data analytics model (HCDA) that can collect data on

previous and current employees for the purpose of increasing employee retention. The value of employees was assessed using evaluations that were based on employee performance that included training and development. Low investment in training results in low commitment, high turnover, and a lack of productivity (Rocha et al., 2018). High turnover negatively impacts productivity (Rocha et al., 2018). Thus, low investment in training can result in high turnover.

Schiemann and Seibert (2017) interviewed the executive staff of Jack in the Box over the company's positive turnaround. Turnover had been high, at 150%, and was reducing profits (Schiemann & Seibert, 2017). Restaurant managers were having difficulty keeping cross-trained employees long enough to establish productivity (Schiemann & Seibert, 2017). The People Equity model, which measures human capital for the prediction of business outcomes, was adopted (Schiemann & Seibert, 2017). The model contained three factors: alignment, capabilities, and engagement (ACE). The executives found that restaurants that participated in the pilot test were 10% more productive and 30% more profitable (Schiemann & Seibert, 2017; Schiemann et al., 2018). Capabilities, including training, were found to be important in predicting turnover and explained 46% of the variance in turnover (Schiemann & Seibert, 2017; Schiemann et al., 2018). Furthermore, effective training was found to be approximately twice as important as any other capability (Schiemann & Seibert, 2017). One tool that can be used to manage turnover and increase employee retention is employee engagement (Chapman et al., 2018).

Employee Engagement. Employee engagement plays a significant role in human capital. Osborne and Hammoud (2017), asserted that engaged employees are productive, while Russell and Taylor (2017) held that human capital is productive. If engaged employees, as well as human capital, are productive, we can conclude that engaged employees are human capital. Organizations cannot be productive without engaging employees (Gilbert et al., 2017). Based on the role of human capital in productivity, engaged employees have a significant impact on organizational success (Dalayga & Baskaran, 2019; Payambarpour & Hooi, 2015; Schiemann et al., 2018). Furthermore, employee engagement reduces absenteeism (Bakker, 2017). Consequently, engaging employees toward productivity is key to profitability.

Engaging employees toward productivity means developing the collective knowledge, skills, and abilities of the organization. High-quality service delivery requires a cohesive, formidable team (Ojo & Akinwumi, 2015). This begins with the selection of human capital that aligns with organizational culture (Bakker, 2017). Organizational success increasingly depends on having talented employees in an organization who are motivated to work (Mueller, 2019). The role of leadership in establishing the right climate in the organization through human resource practices for employee engagement cannot be overstated (Black & La Venture, 2017; Bowen, 2019). A service climate by organizations facilitates the creation of value (Bowen, 2019). When employees are hired appropriately for jobs well-crafted by organizational leadership and trained in firm-specific knowledge, they are motivated to work productively to bring value to the organization.

Management engages employees to motivate them to work. People may stay with an organization in tough times, but not be motivated to work, thereby keeping performance low (Schiemann et al., 2018). Thus, the manager who is tasked with motivating employees to work, is an antecedent to human capital in the organization (Gilbert et al., 2017). Managerial competencies (such as business vision, customer orientation, negotiation, teamwork, delegation, innovation, and time management) are personal resources that over time result in engaged employees (Lara & Salas-Vallina, 2017; Payambarpour & Hooi, 2015; Smith et al., 2016). Thus, both employees and their leaders have a part to play in organizational performance.

Through collective knowledge, skills, and abilities, organizational leaders can engage employees toward a commitment to the organization. Employee engagement results in committed employees (Payambarpour & Hooi, 2015; Salau et al., 2016). Harrell-Cook, et al. (2017) asserted that employee commitment to the employer and vice versa is a reciprocal relationship, without which employees cannot engage. Daneshgari and Moore (2016) argued that employee commitment to enhancing skills is the key to bringing positive change. Commitment links training with organizational performance (Daneshgari & Moore, 2016). Thus, employees who are trained and engaged by leadership demonstrate greater commitment to enhancing organizational performance.

The leadership, culture, teamwork, and support perceived by employees is what motivates them toward engagement (Al Mehrzi & Singh, 2016). A culture that fails to match employee job expectations contributes to employee disengagement (Al Mehrzi & Singh, 2016). Not knowing whether commitment comes first, or engagement comes first

can make managing employees a perpetual challenge (Dalayga & Baskaran, 2019).

Leadership and management, who are willing to train and develop employees, can engage them in ways that positively impact their commitment toward productivity and profitability of the organization (Osborne & Hammoud, 2017; Phillips & Phillips, 2019).

The costs involved in training and development, however, may deter organizational leaders in their quest to maintain profitability by keeping costs down.

A connection needs to be made between training, and organizational performance, to encourage leaders of organizations in Nigeria to invest in employee development. In business, some of the greatest costs are the costs of labor (Bello et al., 2013). Because of scarce resources, the need to keep costs down while stabilizing or increasing revenue may deter management from investing funds in employee development (Mueller, 2019). If leaders understand that knowledgeable, skilled employees become engaged employees who are committed to the productivity of the organization; and that the productivity of the organization through human capital is a precursor to profitability, they will see a clear connection to organizational performance. Thus, knowing that employee engagement can result in a productive workforce that can put an organization on the road to profitability may get organizational leadership to invest in employee development.

Productivity in Nigeria

When researchers referred to human capital in the literature, they were generally referring to the productivity of employees. Human capital is productive (Russell & Taylor, 2017). The goal in this study for the productivity variable was to measure a single factor: labor productivity. Labor, as a single factor is used to measure organizational sales

against labor costs, with higher ratios indicating greater labor productivity. Labor productivity, or human capital, is considered an input and internal capability of an organization (Zouaghi et al., 2018). In this respect, the ability of an organization to produce goods and services profitably is impacted by the availability of human capital.

Human capital availability in Nigeria requires critical attention. Governmental support for economic markets is almost non-existent due to conflict on the continent, weak and inadequate public services, and weak regulatory environments (World Bank, 2019, April 11). The World Bank's human capital index (HCI), which measures productivity, indicates that the pool of human capital resources in Nigeria is not only limited, but grim for the future (World Bank, 2019, April 11). The next generation's level of productivity in sub-Saharan Africa (SSA) is expected to be only 40%, compared to a global rate of 57% (World Bank, 2019, April 11). Recently, Nigeria became one of 22 countries to pledge prioritization of human capital to increase learning adjusted years of school by 20%, from 4.94 to 5.88 by 2023 (World Bank, 2019, April 11). Thus, the future pool of human capital available for hire may be of better quality. However, the country needs to do more to attract and retain human capital in the nation for the sake of the country's organizations. Additionally, leaders of organizations listed on the Nigerian Stock Exchange need to commit to investing the necessary resources to retain world-class human capital.

Human capital has become an increasingly important subject in recent years as rising costs have made productivity an important topic in business (Kämäräinen et al., 2016; Lufungula & Borromeo, 2019; Ojo & Akinwumi, 2015). The value that employees

contribute to organizations through productivity is the essence of human capital (Molloy & Barney, 2015; Salau et al., 2016). To contribute to the productivity and profitability of organizations, employees must be motivated to stay and contribute their skills knowledge to the organization and for the welfare of the country. However, employees in Nigeria's organizations who become highly educated, trained, and skilled seek employment overseas due to poor work environments and infrastructure in Nigeria (Salau et al., 2016).

Poor environments and infrastructure result from poor management of resources (Ojo & Akinwumi, 2015). This can result in a lack of motivation among employees and further disincentivize leaders from investing resources in unproductive employees (Ojo & Akinwumi, 2015). Investments in the training and development of employees mitigate these effects by empowering them toward discretionary effort, innovation, and greater productivity (Bello et al., 2013; Lufungula & Borromeo, 2019). In their study in the Democratic Republic of Congo, Lufungula and Borromeo found that a lack of human capital impeded organizational performance. Health institutions fail because of errors, mistakes, fraud, and theft, as well as wastage, duplication of systems, inefficient use of the workforce, and supply chain inefficiencies, augmented by the conflict in the region that impacts the availability of human capital in hospitals (Lufungula & Borromeo, 2019).

By leveraging the collective knowledge, skills, and abilities of employees in organizations, leaders in Nigeria can engage employees productively with less effort. Capable employees complete assignments well, and this is what makes human capital the backbone for organizational success (Lufungula & Borromeo, 2019). The productivity of

human capital can be observed through knowledge exchange within the organization. Human capital is the brainpower of the employee (Lufungula & Borromeo, 2019). Knowledge management, or the transfer and application of knowledge to, and among employees, is power (Lufungula & Borromeo, 2019) that results in productive value (Molloy & Barney, 2015). Thus, knowledge can establish the power to generate profits through the value of human capital in organizations.

Researchers were not always in agreement as to how the value in human capital results in productivity. Osborne and Hammoud (2017) asserted that productivity is determined by engaged employees. Bode and Perez Villar (2017) held that productivity results from creativity. The premise behind the present study is that productivity results from the quality and levels of training and education. High levels of education are required to develop new knowledge and ideas (Danquah & Amankwah-Amoah, 2017). The knowledge exchange process can be expensive. In a knowledge-based global economy, some of the largest costs are labor costs. With high costs and infrastructure challenges, leaders of organizations listed on the Nigerian Stock Exchange need to understand the relationship between human capital, productivity, and profitability, to willingly source and invest in world-class human capital that can innovate.

The collective value of human capital as an input can increase productivity exponentially. Knowledge transfer within an organization positively impacts the financial performance of the organization (Lufungula & Borromeo, 2019). The aggregate value of employees in an organization provides greater productivity (Delery & Roumpi, 2017). Productivity growth represents the potential that can be released through aggregate

human capital (Danquah & Amankwah-Amoah, 2017). Human capital theory embodies the educational attainment of human capital that is useful to produce goods and services (Danquah & Amankwah-Amoah, 2017). Consequently, the attainment of knowledge and skills by employees that are specific to the organization is critical to the productivity of organizations.

The lack of availability of human capital in Nigeria presents challenges. First, the lack of access to high productivity employees may constrain organizational strategy (Carlier et al., 2019). Organizations cannot effectively implement strategic initiatives without employees who understand how to implement them. Second, low-skilled workers with poor resources and inadequate information may have a profoundly negative impact on productivity (Schiemann, 2009). Benos and Karagiannis (2016) examined the productivity of human capital from developed countries' perspectives, while Danquah and Amankwah-Amoah (2017) examined productivity from developing countries' perspectives. Both found that higher education levels, including upper secondary and tertiary education, were strongly associated with productivity. Nations that focus solely on primary and lower secondary education have little or no impact on the productivity of organizations in the nation (Benos & Karagiannis, 2016; Danquah & Amankwah-Amoah, 2017). In this respect, the impact of education on developed and developing countries is similar.

McGuirk et al. (2015) asserted that innovation is the driver of productivity. Individuals with tertiary education have a greater capacity to increase productivity through innovation because innovation is skill-intensive (Danquah & Amankwah-

Amoah, 2017). Quality and advanced levels of education and knowledge are needed to adopt complex foreign technology and are considered antecedents to innovation (Benos & Karagiannis, 2016; Danquah & Amankwah-Amoah, 2017). Thus, increased productivity growth through innovation can potentially be achieved through the aggregate value of world-class human capital obtained by organizations listed on the Nigerian Stock Exchange.

Innovation

McGuirk et al. (2015) defined innovation as the commercial use of new knowledge and the implementation of new ideas. Danquah and Amankwah-Amoah (2017) described innovation as the essence of productivity growth that is released through the potential in aggregate human capital. Productivity growth is linked to innovation (Danquah & Amankwah-Amoah, 2017). It is the productivity growth that occurs as the collective knowledge in an organization implements new knowledge and ideas. To develop new knowledge and ideas, high levels of education and skill are required (Danquah & Amankwah-Amoah, 2017). Danquah and Amankwah-Amoah examined the effects of human capital on innovation and technology adoption in the developing countries of sub-Saharan Africa (SSA) and found negative productivity growth in all, but three countries. Danquah and Amankwah-Amoah called on African leaders to increase investments in higher education to build skills for innovation. Due to constraints on organizational growth, reduced levels of higher education, and resulting deficiencies in employee ability to innovate and adopt foreign technology were expected (Danquah & Amankwah-Amoah, 2017). Knowledge is the most significant asset of any organization

(Danquah & Amankwah-Amoah, 2017). By improving the value of human capital in organizations, leaders listed on the Nigerian Stock Exchange can increase innovation and benefit from high productivity employees, while increasing profitability.

Appropriately skilled employees can engage and work willingly. Appropriate skills and expertise, as well as a willingness to work, are what results in innovation (McGuirk et al., 2015). Researchers found that productivity improved when organizations invested in employees with appropriate skills and expertise, who are willing to work (Carlier et al., 2019; Forrester, 2019). Some employees are more productive than others (Carlier et al., 2019). The difference between high and low productivity workers is the effort and level of quality they put into producing products (Carlier et al. (2019). Employees with appropriate skills, who are willing to work, can be highly productive and innovative. Investment in firm-specific training is more likely to increase productivity and innovation (Rocha et al., 2018).

Firm-Specific Training

Mahoney and Kor (2015) highlighted the importance of investing in firm-specific knowledge. Underinvestment negatively impacts value creation, while investment in firm-specific human capital enhances value by building core competencies (Mahoney & Kor, 2015). Investing in firm-specific human capital could help build core competencies in the organization and increase aggregate human capital. Collective investments increase the collective output of labor by increasing human capital in the organization (Delery & Roumpi, 2017). To benefit the organization, efforts at leveraging human resources need to focus on knowledge, skills, and abilities specific to the organization (Delery &

Roumpi, 2017). Firm-specific training that trains employees in the ways of the organization serves to increase human capital as employees use the knowledge and skills to benefit the organization.

Through training in firm-specific skills, the collective output of labor in an organization can be compounded for greater productivity. Firm-specific training enables differentiation that can increase productivity, or the value of collective human capital as an internal capability (Carlier et al., 2019; Zouaghi et al., 2018). This highlights the importance of human capital as an internal capability that can differentiate an organization. Collective knowledge, skills, and abilities in an organization are leveraged through firm-specific learning to achieve greater productivity than can be obtained from a single individual. Increased productivity that represents the value of human capital within the organization was associated with favorable organizational outcomes, such as profitability (Schneider & Blankenship, 2017). An organization with greater productivity is expected to demonstrate greater profitability. Thus, a productive workforce is an effective determinant of profitability.

Profitability

Low-profit margins are a continual threat to the sustainability of organizations. Profitability is a management problem that comes from efficient organizational operations (Russell & Taylor, 2017). The efficient operation of all inputs, including labor productivity results in greater outputs, including revenue. The resulting profit or loss highlights the efficiency of an operation. In his research on the theories of profit, Makadok (2011) sought to find out why some companies make a consistent profit, while

others do not, and to determine what managers can do about it. Makadok defined profit as the historical performance of an organization when leaders could no longer impact the profitability of the organization. In this way, Makadok distinguished profit from profitability. Profit from an accounting perspective is the difference between the revenue generated by an organization in each accounting period, and expenses incurred in the same period in the process of producing revenue. In this respect, Obaleye (2018) described profit as a type of measurement. Profit is historical and measures the performance of an organization for a given period. Porter (1996) described profitability as the increased revenue that comes from an organization's ability to charge higher prices; or an organization's efficiency that results in lower per-unit costs. Profitability is the current operational state that managers can use to exploit and generate profits (Porter, 1996; Russell & Taylor, 2017). In this respect, management can manipulate operations for increased profits.

Still, profitability remains a perplexing problem for many organizations. Management endures and must continually implement opposing forces that decrease profits over time, then reverse course to return to profitability (Makadok, 2011). This is the operational dilemma of organizations listed on the Nigerian Stock Exchange and other for-profit organizations. Porter (2008) asserted that profitability is impacted by industry competitive forces, power of suppliers and buyers, and new entrants to the industry. Depending on what is happening in these areas, organizations must continually adjust to stay competitive, and profitable. Consequently, organizational strategy is the key to profitability (Porter, 1996). Organizational strategy is not the same as operational

effectiveness. Operational effectiveness, such as productivity, does not always translate in greater profitability (Porter, 1996). Operational effectiveness results in profits by an organization only in the period of analysis. When revenues per unit increase and costs per unit remain the same or decrease, profits result. When revenues per unit remain the same, and costs per unit decrease, profits result. Thus, profitability relies heavily on strategy as well as operational effectiveness (Porter, 1996). Winning strategies increase revenues per unit or decrease costs per unit and put organizations in a viable competitive position for profitability (Porter, 1996). With a combination of winning strategies and efficient operations, organizations can be profitable.

Factors that influence organizational profitability are internal and external to an organization. External influences include global forces, such as industry-level forces, and exchange rates (Nanda & Panda, 2018). Global forces require effective external competencies. External competencies that directly affect profitability include the ability to seize opportunities (Lara & Salas-Vallina, 2017). Global forces can make it impossible for organizations to profit without innovation (Nanda & Panda, 2018), which highlights the importance of general human capital in the profitability of organizations. A significant way for organizations listed on the Nigerian Stock Exchange to influence profitability is to hire quality human capital, and for the nation to increase the quality of human capital available to organizations. Organizations in Nigeria are impacted by the human capital available in the nation. Exchange rates based on a weak Nigerian currency (naira) against the US dollar, make imported human capital exorbitant.

The survival of organizations depends on leadership's ability to maintain productivity and maximize profits (Black & La Venture, 2017; Osborne & Hammoud, 2017). To do so requires tactics that address both internal and external forces. Internal capabilities can be obtained and sustained through human capital. Profitability can be explained by firm-specific determinants (Nanda & Panda, 2018). Nanda and Panda found that internal, that is, firm-specific forces (such as firm size, liquidity, capital intensity, leverage, and market share) have a greater influence than global determinants in predicting profitability.

Unproductive *human capital* has a profoundly negative impact on profitability (Stoyanova & Iliev, 2017). Kumar and Pansari (2015) found that disengaged employees caused organizations to be 10–15% less profitable than organizations with engaged employees. The essence of competition that results in profitability is organizational leadership's ability to use capabilities and talent more effectively than competitors. Porter (2008) found that underlying profitability drivers are similar for competitors in the same industry. Rizea (2015) found that only 36% of profitability could be seen from firm-specific factors, thereby concluding that the economic strength of organizations was best measured against competitors. Rizea used Porter's five forces to highlight the need to assess industry attractiveness. If competitive forces were intense, organizations in the industry would struggle to make a profit. If competitive forces were low, organizations in the industry would generate more profits. Understanding Porter's five forces—power of buyers, threat of new entrants to an industry, bargaining power of suppliers, threat of substitute products, and rivalry among existing competitors—can enable organizations to

influence industry profitability over time. The industry is a significant factor in the profitability of organizations.

Organizations that can use their capabilities, including talent, more effectively than their competitors can be more profitable (Rizea, 2015). Knowledge exchange was considered the primary source of competitive advantage (Gilbert et al., 2017; Lara & Salas-Vallina, 2017; Russell & Taylor, 2017; Schiemann et al., 2018). Knowledge management was the key to building internal capabilities such as organizational strategy, competencies, structures, innovation, and resources (Lara & Salas-Vallina, 2017). Capabilities could be developed through firm-specific information. Knowledge is disseminated through firm-specific training in company culture and company secrets; developed through innovation and protected by patents and trademarks. Investments in employees through knowledge exchange enabled innovation and drove business growth (McGuirk, et al., 2015). As the business grows, firm size, which is an important determinant of profitability, increases (Nanda & Panda, 2018). Thus, through knowledge exchange facilitated by firm-specific training, leadership can increase innovation and drive business growth and profitability.

Profitability is the key to organizational sustainability. Sogue and Akçaöz (2018) defined profitability as the return that investments bring back to owners. Without returns, the organization cannot survive long. To support desired growth and profit, organizational leaders need to focus less on results and numbers and more on investments in employees (Black & La Venture, 2017). This can be accomplished by aligning operational systems with a focus on human capital (Black & La Venture, 2017).

Alignment is the process of connecting employee behavior with organizational values and is considered crucial to profitability in organizations (Schiemann, 2009; Schiemann et al., 2018). Effective leadership provides vision and direction (Osborne & Hammoud, 2017). Leaders can improve long-term profitability through the retention of the knowledge and skills of engaged employees, understanding that these employees can create value for their organizations (Smith et al., 2016). The survival of an organization depends on organizational leadership's ability to maintain productivity and maximize profits (Osborne & Hammoud, 2017). Human capital is the key to increased productivity and profitability.

Methodologies

Few studies have addressed profitability from a quantitative perspective. Black and La Venture (2017) discussed the impact of organizational culture on profitability from a qualitative perspective. With an emphasis on the *human factor* in profitability, Black and La Venture called for organizations to build a culture around key groups of people in an organization: leaders, managers, and employees. A people-centered culture supports substantial growth and profits because it creates a climate that is conducive to communication, trust, responsiveness to change, and organizational resilience (Black & La Venture, 2017). This ability to adapt is key to outperforming organizations with traditional cultures (Black & La Venture, 2017). Gupta and Sharma (2016) agreed, saying that although profitability can be observed in higher outcomes, such as sales numbers, customer loyalty, and employee retention, utmost attention must be paid to the contribution of employees and their needs and expectations. Samagaio and Rodrigues

(2016) used a survey to study the relationship between human capital and profitability of 26 Portuguese audit firms. Despite the reference to a relationship, the study was qualitative. They found that professional proficiency and knowledge, both generic and specific, drive productivity as well as profitability in audit firms. Some of the most effective drivers of employee engagement are nonfinancial, including training and development, health and safety, pay and benefits, career trajectory, job satisfaction, work-life balance, and performance and appraisals (Gupta & Sharma, 2016). Effective communication leads to an engaged workforce, higher productivity, and profitability, as well as lower turnover and higher retention (Gupta & Sharma, 2016).

Some quantitative studies addressed profitability. Kuncová et al. (2016), used a linear regression model to study the relationship between the economic performance of organizations in the swine sector of the Czech Republic and profitability. They used financial ratios to evaluate economic performance and profitability. Profitability ratios, return on assets (ROA), return on equity (ROE), and return on sales (ROS), were used to measure financial performance. The higher the financial ratios, the better the economic performance. Sales and total assets are good indicators of firm size (Kuncová et al., 2016). Due to economies of scale, larger firms have more efficient operations, while smaller firms are more flexible and adaptable (Kuncová et al., 2016). Kuncová et al. found that firm size and initial capital infusion explained differences in economic performance. Nanda and Panda (2018) also used regression analysis to identify determinants of corporate profitability in Indian manufacturing firms. Nanda and Panda

found that firm size and liquidity are determinants of profitability, while leverage results in less profitability.

Nanda and Panda (2018) used ROA and net profit margin (NPM) to measure profitability and found that firm-specific factors, including human capital, can impact profitability. Rizea (2015) found that firm-specific factors explain a small percentage of the profitability observed in organizations (approx. 36%). The essence of competition that results in profitability is the ability to use capabilities and talent more effectively than competitors. Talent and capabilities that result in sustained profitability require adequate investment in the collective knowledge, skills, and abilities of human capital among organizations listed on the Nigerian Stock Exchange. Profitable organizations contribute positively to a country's gross domestic product (GDP) while bringing employment and prosperity to individuals in a nation. Thus, profitability is a subject of paramount importance (Işık, 2017).

Summary

In this literature review, I presented the variables for this study: human capital, productivity, and profitability as well as the theory selected for the study, human capital theory. I began the review with a presentation of human capital theory, followed by supporting and contrasting theories and measurement of the variables. Then I analyzed studies relating to the first independent variable, human capital, followed by analyses of studies addressing the second independent variable, productivity, and the dependent variable, profitability. I ended the review of the extant literature with methodologies through which prior researchers have addressed profitability.

Transition

In Section 1, I discussed the challenges, with regards to profitability, among organizations listed on the Nigerian Stock Exchange. In the discussion, I covered the challenges as they relate to human capital, productivity, and profitability. I outlined a general and specific problem statement, in which I highlighted the impact of the challenges. After the problem statement, I articulated an aligned purpose statement outlining the proposed methodology and research design, along with the target population, geographical location, and the potential of the research for social change. The target population consists of organizations listed on the Nigerian Stock Exchange. The geographical location is Nigeria. The research question that guides the study and hypotheses, followed. Next, I outlined and expanded upon the theoretical framework, then used operational definitions to clarify terms that can help the reader understand the meaning of each term within the context of the research. I then used assumptions, limitations, and delimitations to highlight impediments to the research process that need to be controlled. In the long run, organizations must be profitable to stay in business. I expanded upon this in the significance of the study. In addition to expanding on human capital theory in the literature review, I outlined the views of various researchers in the field of human capital with a focus on productivity and profitability.

In section 2, I address the technical aspects of the study and reiterate the purpose of the study, followed by the role of the researcher and participants. For the research method, I expand upon the nature of the study to support the rationale for the quantitative method and correlational design selected. I describe the population and articulate and

defend the sampling method for this correlational study. Next, I explain the informed consent process in ethical research along with the required elements for protecting the confidentiality of participants. Finally, I describe and defend the data collection instruments and the techniques I use to collect the data, analysis of the data, and internal and external validity. I end section 2 with a transition introducing section 3 and a summary.

Section 2: The Project

In this section, I restate the purpose of the research, describe my role as the researcher, discuss the participants, the research method and design, and the population and sampling. I further discuss the procedure for conducting ethical research, instrumentation, the data collection technique, and data analyses. The study's validity and transition, followed by a summary, end the section.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship between human capital, productivity, and profitability. The predictor variables were human capital and productivity. The dependent variable was profitability. The target population for the study were organizations listed on the Nigerian Stock Exchange. This population is appropriate because profitability is analyzed at the organizational level. A lack of human capital in Nigerian organizations can deter profitability and sustainability, thereby impacting the welfare of citizens and the nation (Ojo & Akinwumi, 2015). A labor system that includes the appropriate training of individuals for work promotes the health and well-being of a nation (World Bank, 2019, April 11; Yang et al., 2018). Implications for social change include the potential for increased profitability and sustainability of organizations listed on the Nigerian Stock Exchange through a skilled, productive, well-educated workforce that can support the growth of human capital in the nation.

Role of the Researcher

Empirical research can help provide practical answers to problems in organizations. The role of a researcher is to present research in ways that build on the body of knowledge in a consistent way (Pek & Flora, 2018). As a student researcher, I identify an appropriate organization for the conduct of my research and establish access to the organization to enable appropriate data collection (Saunders et al., 2015). These factors must be considered while formulating the research question and design (Saunders et al., 2015). To build on a body of knowledge, research should provide meaningful scientific results and be reproducible and dependable (Pek & Flora, 2018). The research should be reported with the reader in mind, demonstrate clarity and transparency with a perpetual focus on the research question, and be free of unnecessary complexity (Pek & Flora, 2018). One of the goals behind quantitative research is to test theories that can help managers make effective decisions for their organizations (Corner, 2002). I began by building knowledge about the proposed study and found an appropriate theory, measures, and potential analytical techniques for data collection, as recommended by Corner (2002). I selected human capital theory to form the basis for this study in the hope that it would provide practical answers for sustained profitability in organizations listed on the Nigerian Stock Exchange.

I developed and articulated an appropriate research method for data collection. A key component of the research design is to articulate the process for data collection (Saunders et al., 2015). Key activities in this project are outlined in the research design. Throughout the process, I tried to avoid bias that could result from subjective views and

false assumptions in the process of analyzing the data, which can affect the reliability of results (Saunders et al., 2015). Carefully thinking through and articulating the data collection process made it possible for me to perform the research in a valid and ethical manner to appropriately confirm or reject the research findings.

Participants in this research project were organizations listed on the Nigerian Stock Exchange that I have had no relationship with. Furthermore, the only significant relationship I have had with the topic before this research has been through the management of the profitability of organizations outside Nigeria. I obtained secondary information for listed organizations on the Nigerian Stock Exchange (2020) website. Organizations that were eligible for inclusion in the study have audited financial statements available on the Nigerian Stock Exchange website. Before testing, this project was first accepted by the Walden University Institutional Review Board (IRB). Student research projects must comply with ethical codes of conduct developed by the university ethics committee based on the Belmont report (Office for Human Research Protections, 1979, April 18).

The Belmont Report

Troubling ethical questions can arise during the process of conducting research (Office for Human Research Protections, 1979, April 18). Ethical concerns can arise throughout the research process and are of concern throughout the research project, from developing the research design to handling participants, to collecting data, and to the analysis and reporting stages (Saunders, et al., 2015). The Belmont report was created to outline basic principles for conducting research on human subjects (Office for Human

Research Protections, 1979, April 18). The basic principles of the Belmont Report are (a) respect for persons, (b) beneficence, and (c) justice (Office for Human Research Protections, 1979, April 18).

Respect for Persons

As the researcher, I must view people as individuals capable of deciding for themselves and protect those who are incapable of protecting themselves (Office for Human Research Protections, 1979, April 18). Informed consent provides a way for me to gain and maintain the trust of participants in the study (Grady, 2015; Humphreys, 2015). Individual participation in the research project must be voluntary and informed (Office for Human Research Protections, 1979, April 18). Because there were no human participants in this study, as it was based on publicly available secondary data for organizations, informed consent was unnecessary.

Beneficence

Beneficence means I am obligated to make every effort to assure the well-being of research subjects. Assuring the well-being of research subjects means doing them no harm. Furthermore, assuring the well-being of research subjects means minimizing harm while maximizing benefits. In so doing, I must not impose undue burdens on research subjects or withhold benefits. There were no human research subjects in this study. Furthermore, any information obtained from the Nigerian Stock Exchange was managed in ways that maintained the confidentiality of organizations in the study.

Justice

In addition to respect for persons and beneficence, I must assure justice for participants. *Justice* means that I deal with everyone based on (a) equal share, (b) individual need, (c) individual effort, (d) societal contribution, and (e) merit (Office for Human Research Protections, 1979, April 18). Necessary guidelines were observed throughout the data collection process to mitigate bias. The participants in this study were not individuals. Participants were organizations listed on the Nigerian Stock Exchange.

Participants

Eligibility

Various concerns must be addressed in the process of selecting participants. Martínez-Mesa et al. (2016) highlighted four considerations for selecting participants:

1. Will a sample or a census be used for the study?
2. What is the basis of the sample?
3. What sampling process will be used?
4. What is the potential effect of non-respondents on findings?

When possible, a census is preferable to a sample (Martínez-Mesa et al., 2016). With audited financial statements for 169 organizations available online, it was practical to perform a census. So, I conducted this study based on a census. Eligible participants in this study were organizations listed on the Nigerian Stock Exchange. Audited financial statements of the organizations from 2005 to 2019 were selected and analyzed.

Strategies for Gaining Access

The population of organizations listed on the Nigerian Stock Exchange is available on the internet (Nigerian Stock Exchange, 2020). The vision of the Nigerian Stock Exchange is to be the preferred exchange hub for Africa (Nigerian Stock Exchange, 2020). The organization's mission is to use the hub to enable reliable access to capital for investors and businesses based on core values of ambition, inclusion, and fairness (Nigerian Stock Exchange, 2020). Corporate information, including organization profiles and financial statements, is available on the website.

Strategies for Establishing a Working Relationship

I used an archival strategy based on secondary data publicly available on the Nigerian Stock Exchange (2020) website. Although the privacy and confidentiality of participants remain of utmost importance, this study did not involve direct contact with individual participants or contact with vulnerable individuals, such as children. As a result, informed consent by participants was not required.

Participant Alignment

The unit of analysis selected for this study was organizations because profitability is analyzed at the organizational level. The unit of analysis is critical for assuring that the correct sample is selected for measurement (Francis et al., 1999; Saunders et al., 2015). Variables operate at the individual, group, or unit level and the conclusions drawn at one level may not apply to another. In their study on city markets as a unit of analysis, Francis et al. (1999) found that city-level markets for CPA firms varied significantly from regional and national markets. The national leader was not always the city-level leader

when it came to audit contracts (Francis et al., 1999). Francis et al. (1999) elected to use the city-level as the unit of analysis. In this study, all three variables—human capital, productivity, and profitability—were analyzed at the organizational level. Thus, any generalizations for this study are at the organizational level.

Research Method and Design

A researcher must scientifically address the research question. Quantitative research is used to examine relationships among variables, using statistical procedures to analyze data and predict relationships to generalize findings to larger populations (Saunders et al., 2015). I examined the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. The following sections outline the research method and the research design used.

Research Method

I chose a quantitative methodology for this study. Methodology choices are quantitative, qualitative, or mixed methods (Saunders et al., 2015). A researcher makes several decisions in the process of selecting a method for use in a study. A critical decision involves the philosophical leaning of the researcher. Philosophical leanings may be positivism, critical realism, interpretivism, postmodernism, or pragmatism (Saunders et al., 2015). Quantitative methodologies follow the rigid requirements of positivist philosophies, which require that other researchers be able to replicate the study. Qualitative studies stem from interpretive researchers who are interested in capturing conditions unique to the settings of participants; they are not designed to be measured against rigid requirements (Saunders et al., 2015). A mixed-methods study combines the

use of both quantitative and qualitative perspectives (Saunders et al., 2015). The goal of this study was to examine the effectiveness of human capital and productivity in predicting profitability for the stated population and potentially beyond. The study leaned toward positivist philosophies that require the study to be replicable. Consequently, a qualitative methodology and qualitative aspects of a mixed-methods study were inappropriate.

Another important decision involves the approach to theory development. Approaches to theory development include deduction, abduction, and induction (Saunders et al., 2015). Deductive studies are used to establish relationships among variables (Saunders et al., 2015). If a researcher tests a theory, their approach is deductive (Saunders et al., 2015). If a researcher seeks to explore a phenomenon to build theory, the research is inductive (Saunders et al., 2015). Inductive research is used to collect data using qualitative methods to observe patterns and understand a problem based on a conceptual framework (Saunders et al., 2015). An abductive approach is used to explore a phenomenon to generate a new theory or modify an existing theory (Saunders et al., 2015). Abductive studies go back and forth between inductive and deductive methods by obtaining data, formulating a theory, then testing the theory (Saunders et al., 2015). The mixed-methods approach combines quantitative and qualitative approaches and is associated with abductive approaches (Saunders et al., 2015). The approach toward theory development in this study was deductive: to examine the relationship between human capital, productivity, and profitability to test human capital theory. Thus, the deductive approach guided the development of theory in this study.

Research Design

I chose a correlational design for this study. Correlation examines a change in one variable in relation to another in quantitative studies (Saunders et al., 2015). Coherence throughout the articulation of the research project is crucial to establishing an effective plan to answer the research question (Saunders et al., 2015). A formal study articulates precise procedures for testing a hypothesis (Cooper & Schindler, 2014), which provides a blueprint for the design elements (Corner, 2002). The variables in the hypothesis indicate appropriate measures, and the relationships in the construct indicate appropriate techniques for use in the research (Corner, 2002). The single continuous dependent variable in this study, profitability, and the continuous predictor variables, human capital, and productivity, indicated the use of regression analysis (Corner, 2002; Plonsky & Ghanbar, 2018). Thus, I chose multiple regression analysis to examine the relationships among variables in this study.

The variables in this study were not manipulated as happens in a causal study. Causation is used for true experiments (Bleske-Rechek et al., 2015; Coogan, 2015; Cooper & Schindler, 2014). Causation examines the cause and effect of one variable by manipulating another and is sometimes confused with correlation (Bleske-Rechek et al., 2015). Correlation examines a simultaneous change in one variable in relation to another (Cooper & Schindler, 2014; Saunders et al., 2015). Bleske-Rechek et al. provided an example to illustrate the difference: Although height may correlate with weight, one cannot say that height causes weight. Quantitative research methods are associated with experimental, archival, and survey strategies (Saunders et al., 2015). Qualitative research

designs are associated with case studies, ethnography, and action research (Saunders et al., 2015). To examine the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange and potentially beyond, a correlational design was appropriate for this study and an archival strategy was selected.

Population and Sampling

Population

The population for this study is organizations listed on the Nigerian Stock Exchange. A population represents the set of cases that can be used to select a sample (Saunders et al., 2015). The Nigerian Stock Exchange has 169 organizations listed on the website (Appendix A). The number of organizations was adequate for the performance of a census. The unit of analysis is the organization, so this population is appropriate for answering the research question because profitability is measured at the organizational level. The scope of the study is limited to human capital in the aggregate, labor productivity, and profitability of the organizations.

Sampling

With audited financial statements for 169 organizations available on the Nigerian Stock Exchange website, it was practical to perform a census. When possible, a census is preferable to a sample (Martínez-Mesa et al., 2016). A sample is used when it is impractical to obtain data on the entire population (Saunders et al., 2015). To obtain the appropriate sample size, an *a priori* analysis was conducted using G*Power 3.1.9.6 (MacUpdate, 2020). G*Power is a statistical software package used by social science

researchers to conduct statistical power analysis (Mayr et al., 2007). *A priori* analysis is conducted prior to the beginning of the study and is ideal as a power analysis tool for its ability to enable users to control type 1 errors, the probability of rejecting a null hypothesis that is true (as well as type 2 errors, the probability of accepting a null hypothesis that is false) (Mayr et al., 2007). Assuming a medium effect size ($f^2 = .15$) (Maiti & Saikia, 2019; Obaleye, 2018), $\alpha = .05$, and 2 predictor variables, the *a priori* analysis for this study indicated a minimum sample size of 68 to achieve a statistical power of .80 (Appendix E). Increasing the statistical power to .99 revealed a sample size of 146 (MacUpdate, 2020). The data from the audited financial statements of the 169 organizations ($N = 836$) were far greater than the minimum sample size requirement of 146 at the .99 statistical power level. A larger sample size lowers the likelihood of error in generalizing the findings to a target population (Saunders et al., 2015). Eligible organizations in this study were organizations listed on the Nigerian Stock Exchange website for which audited financial statements were available between 2005 and 2019.

Ethical Research

Although science benefits society, the process of conducting research can present troubling ethical questions (Office for Human Research Protections, 1979, April 18). Abuse of human subjects during the Second World War resulted in the Nuremberg war crime trials. The Nuremberg Code became the code of conduct by which physicians and scientists who conducted biomedical experiments on prisoners of war were judged (Mitscherlich & Mielke, 1949). In recent years, the Nuremberg Code has been used as a prototype for assuring ethical research among human subjects (Mitscherlich & Mielke,

1949). A code of conduct (or ethics) is a standard of behavior that guides the social norms of any group and enables good practice as well as a process for evaluating risks (Saunders et al., 2015). Due to differences in views and social norms among various fields of endeavor, codes of conduct have been developed that guide the behavior of members based on principles that matter to the groups (Saunders et al., 2015). The Belmont Report outlined the basic principles for conducting research on human subjects (Office for Human Research Protections, 1979, April 18). Based on the Belmont Report, the university ethics committee developed ethical codes of conduct that student research projects must comply with (Appendix B). The Belmont report principles require that student researchers view participants as individuals who can decide for themselves by assuring that participation in research projects is voluntary and informed and by making every effort to assure the welfare of research subjects (Office for Human Research Protections, 1979, April 18).

Informed Consent

Informed consent is a critical component of ethical research. Informed consent is the authorization that makes activities allowable that might not otherwise have been permissible (Grady, 2015). It is essential that human subjects voluntarily agree to be the subject of a research project without coercion (Mitscherlich & Mielke, 1949). Informed consent provides express authorization by individuals for participation in each research project. In this study, I used secondary data from organizations listed on the Nigerian Stock Exchange. The Nigerian Stock Exchange is the listing organization for public corporations in Nigeria. Because the information is publicly available, informed consent

was not required. Any relevant documents obtained in the process of data collection are included in the appendix section of this study.

Procedures for Withdrawal from the Study

Participants in this study were organizations listed on the Nigerian Stock Exchange, for which audited financial statements were available. Procedures for withdrawal from this study were unnecessary because the study was based on secondary data. In line with the IRB guidelines, no compensation, or incentives to participate in this study were provided to research participants.

Ethical Protection and Confidentiality of Participants

The ethical protection of participants is of utmost importance. Throughout a research study, student researchers must exercise integrity, respect, and objectivity, to avoid any harm to study participants while assuring participants' privacy (Saunders et al., 2015). The Walden University IRB provides training for doctoral students in ethical research as part of the process of IRB approval. No data can be attributed to a specific individual or organization in the documents released for publication (Saunders et al., 2015). I made every effort to assure the privacy and confidentiality of information concerning organizations in this study as well as information concerning individuals that represent the organizations. If the ethical consequences of each decision are considered and addressed throughout the research project, acceptable ethical behavior will have been adopted (Saunders et al., 2015).

Data Management and Documents

The collection of data is based on existing laws in Nigeria, where the research was conducted. Results were analyzed and interpreted to make sure that representations are complete, accurate, and true. Processed data were securely stored in a password-protected external hard-drive and will be locked in a safe for 5 years to protect participants. Any resulting non-confidential documents from this process were added to the appendices and referenced in the study's table of contents. The final doctoral study Walden IRB approval number is 09-30-20-0979226.

Instrumentation

HCROI, the output-based method, and ROA, were respectively used to measure the variables, human capital, productivity, and profitability in this study. Instruments evolve from the management dilemma and the research question to help answer the specific research question under investigation (Cooper & Schindler, 2014). The research question in this study contained two predictor variables, human capital, and productivity, and one dependent variable, profitability.

Validity and Reliability of Instruments

To select an appropriate instrument, measures must be developed for the theoretical constructs under study (Corner, 2002). To do this, two dimensions are required for the proper evaluation of a measurement tool: reliability and validity (Price et al., 2015). Reliability refers to the internal consistency of results to enable reproduction (Saunders et al., 2015; Tang, 2015). Several methods are used for testing instrument reliability: test-re-test, multiple forms, split-half technique, and Cronbach's alpha test.

Cronbach's alpha is better suited for the measurement of latent constructs in primary data with different measures and was not used. Alternate measures of human capital based on the two predictor variables revealed similar results. Validity refers to the trustworthiness of findings in a study (Garavan et al., 2019). Obtaining construct validity of the instrument design that measures human capital, for example, requires a determination of the various dimensions of the concept of human capital and design instruments to generate data on each dimension and then test for correlation among them. The assumption was that different measures of each construct would be highly correlated. The next section addresses the instrumentation of each specific variable.

Human Capital

Fitz-Enz (2009) discussed an enterprise-level metric that can be used to calculate HCROI [1].

$$HCROI = \frac{Total\ Revenue - (Total\ Expenses - Pay\ and\ Benefits)}{Pay\ and\ Benefits} \quad [1]$$

Based on the formula, expenses, excluding pay and benefits are deducted from revenue. Then the result is divided by pay and benefits (Fitz-Enz, 2009). From an organizational perspective, examining inputs based on outputs can provide insight into the returns from the inputs. Human capital in the aggregate is an input of the organization (Kucharčíková et al., 2018). By deducting pay and benefits from the expenses in the numerator, profit per unit invested in human capital is accounted for (Fitz-Enz, 2009). The calculation [1] is represented by a ratio, i.e., 1:1.3 and results in profit per human capital dollar invested (Richard et al., 2009). The higher the ratio, the greater the profit. Thus, the formula

represents a ratio scale of measurement. Metrics, such as gender, ethnicity, and managerial position are not correlated with performance and are of no use to the calculation (Richard et al., 2009). Calculations for aggregate human capital must account for enterprise-level aspects as an input of the organization (Kucharčíková et al., 2018). Calculations for the HCROI are based on enterprise-level aspects, making the model useful for examining human capital in the aggregate to answer the research question in this study.

DiBernardino (2014) and Fitz-Enz (2009) used HCROI to measure human capital while examining the relationship between investments in human capital and profitability. Raghubeer (2018) used HCROI to examine the relationship between human capital effectiveness and financial performance and found a correlation between ROA and HCROI. Using the formula by Fitz-Enz [1], Kucharčíková et al. (2018) used HCROI to evaluate the effectiveness of human capital investment in an e-business context. Other methods were used to determine human capital. Bode and Perez Villar (2017) used creative occupations, instead of education, which is outside the scope of this study. The quality of working life (QWL) index methodology by Kesti et al. (2016) and the human capital index (HCI) by Mubarik et al. (2018) addressed quantitative (as well as qualitative aspects of human capital) and were wider than the scope of this study. Despite the wider scope, Mubarik highlighted education, skills, abilities, training, and experience as core dimensions in human capital, thereby highlighting the focus of this study. Other researchers designed tools for measuring human capital within specific organizations, such as the People Equity model (Schiemann & Seibert, 2017).

HCROI was used in the present study. HCROI may be used to measure the economic contribution of human capital in organizations (Fitz-Enz, 2009). Secondary data from organizations listed on the Nigerian Stock Exchange (Nigerian Stock Exchange, 2020) were used for the HCROI calculation. Data for revenues, expenses, and labor pay and benefits for the years 2005 through 2019 by industry, were collected from audited financial statements of each organization listed on the Nigerian Stock Exchange and analyzed to calculate the HCROI. Greater levels of human capital meant greater levels of productivity (Molloy & Barney, 2015; Tan, 2014).

Productivity

Productivity was measured in this study using the output-based approach [2].

$$\text{Labor Productivity} = \frac{\text{Total Revenue}}{\# \text{ of Employees}} \quad [2]$$

The output-based approach measures the output of a group of people (Russell & Taylor, 2017; Schultz, 1961; Thamma-Apiroam, 2015). To calculate productivity, units, or dollars of output (such as the number of patients served or revenues) are divided by related inputs (such as labor hours or labor costs) (Russell & Taylor, 2017). This results in a ratio of the outputs to the inputs (Russell & Taylor, 2017). Thus, the formula for productivity represents a ratio scale of measurement. The more the outputs generated from the inputs, or the fewer the inputs needed to generate a given level of outputs, the greater the productivity (Price, 1997). The productivity construct was operationalized as labor productivity.

Gross output was operationalized as total revenues, and inputs were operationalized as number of employees. Thus, the calculation yielded the ratio of revenue per employee for each organization. The emphasis on productivity was the output produced, rather than the output sold. Productivity as an efficiency measure is calculated based on inputs and outputs (Kämäräinen et al., 2016). The measure ignores the quality of output (Kämäräinen et al., 2016). The assumption in the calculation is that inputs and outputs increase at the same rate (Russell & Taylor, 2017). Increased productivity is achieved when inputs decrease, or outputs increase without a corresponding increase in inputs. With an emphasis on units produced rather than sold, items such as inventory not sold can pile up and increase inputs without corresponding sales. Nevertheless, the output-based approach provides ease of measurement and interpretation (OECD, 2001).

The Organization for Economic Co-operation and Development (OECD)'s output-based labor productivity measure focuses on the competitiveness of nations in the global marketplace (OECD, 2001). Greater productivity enables a nation to increase the supply of goods and services within the nation (Russell & Taylor, 2017). Productive nations can compete for more customers and in the process improve the lives of their citizens (Russell & Taylor, 2017). Russell and Taylor articulated the formula from an organizational perspective. To determine the productivity of human capital in the organization, the collective output of the organization must be determined based on collective inputs. Organizations on the Nigerian Stock Exchange website (Nigerian Stock Exchange, 2020) were assessed based on levels of human capital for each organization in

the study for the years 2005 through 2019. Greater levels of human capital indicated greater levels of productivity in the organization. Coupled with the human capital and profitability calculations, the output-based approach was expected to yield sufficient insight into the labor productivity of organizations for this study. Thus, I expected to observe more profitability among organizations with greater productivity.

Profitability

ROA [3] was used to assess profitability, the dependent variable in this study.

$$\text{Return on Assets (ROA)} = \frac{\text{EBITDA}}{\text{Total Assets}} \quad [3]$$

In studies, ROA has most often been used to measure the profitability of organizations. Profitability is the return owners get from their investment (Sogue & Akçaöz, 2018). In assessing profitability, ROA is considered more useful than net profit because it can be used to evaluate the value generated from the operation against organizational wealth (Bintara & Tanjung, 2019). The efficiency of the operation is indicated in the ROA calculation. ROA is calculated by dividing earnings before interest, taxes, depreciation, and amortization (EBITDA) by the total assets of an organization (Kuncová et al., 2016). By considering total assets, the ROA calculation reflects the size of organizations.

ROA was selected for this study to account for the different sizes of organizations. Larger organizations have more resources to invest and can impact profitability across organizations (Nanda & Panda, 2018). A higher ROA indicated a more efficient operation (Bintara & Tanjung, 2019), and greater profitability. Data for

calculating the ROA, such as earnings, interest, taxes, depreciation, amortization, and total assets are numerical. Thus, the profitability measurement scale is based on ratio data.

Işık (2017) used ROA to examine the determinants of profitability for listed firms in Istanbul. Firm-specific factors such as firm size, liquidity, firm age, and market volatility were considered determinants of profitability (Appendix C). Işık found that firm size was a significant positive factor in the profitability of the organizations. Kuncová et al. (2016) used ROA to examine firm size as a determinant of firm performance in the Czech Republic swine sector and found that firm size was a significant factor in explaining firm performance. Due to economies of scale, larger firms were found to have more efficient operations, while smaller firms were more flexible and adaptable (Kuncová et al., 2016). Nanda and Panda (2018) used ROA and net profit margin (NPM) to examine the determinants of corporate profitability in Indian manufacturing firms and found that firm-specific factors were a significant factor in determining firm profitability. Škuflić et al. (2016) used net profit before tax as a measure to examine the relationship between indebtedness, concentration, liquidity, productivity, and profitability. Škuflić found a significant relationship between productivity and profitability.

Researchers who tested profitability failed to include human capital as a firm-specific factor in testing the determinants of profitability. The value of employees' rests in the firm-specific knowledge that cannot be transferred to other organizations (McCoy et al., 2019). This knowledge could be reflected in the long-term assets that are on the balance sheet of an organization. Personnel costs, however, are accounted for in the

income statement where costs are deducted from revenue to determine profits. Moving these costs to the balance sheet could help to quantitatively increase profits in the income statement (Akinlo & Olayiwola, 2017; McCoy et al., 2019) and reduce the pressure on managers who must control costs. Human capital could thus impact the profitability of organizations through reporting, as well as through innovation. The objective of this study is to examine the relationship between human capital, productivity, and profitability. Non-confidential data collected for this purpose is available in the appendices.

Data Collection Technique

I used an archival strategy based on secondary data for this study. While primary data refers to data collected by the researcher for a specific study, secondary data are data collected by other researchers in the context of research, or non-researchers outside the specific context of research, often for other purposes that may be further used to generate ideas (Saunders et al., 2015). Numerous sources of secondary data are available on the internet for researcher access, such as the data on the Nigerian Stock Exchange that was used for this study. Conducting archival research using data from secondary sources is becoming a common method among researchers (Kjell & Rae, 2015). Accordingly, the use of secondary data is not new.

The secondary data source for this study was the website of the Nigerian Stock Exchange. The Nigerian Stock Exchange is the listing organization for publicly traded corporations in Nigeria (Nigerian Stock Exchange, 2020). It is privately owned but overseen by the Nigerian government and the Securities and Exchange Commission

(SEC). The Nigerian Stock Exchange is considered a reliable source for publicly available secondary data (Nigerian Stock Exchange, 2020). The data were used to analyze the variables in this study.

There are advantages to using secondary data. One advantage is that the data exist and can be evaluated before use (Saunders et al., 2015). Another advantage is that the data are likely to be of much better quality than any graduate student can independently collect (Saunders et al., 2015). Research is expensive and the savings in resources of using secondary data can be substantial (Saunders et al., 2015). Large-scale survey research is particularly expensive, and large-scale longitudinal survey research is both exorbitantly expensive and time prohibitive for a graduate student. Collecting high-quality quantitative data is both expensive and time-consuming, and the costs involved in collecting primary data may be greater than resources available to many graduate students. Data from secondary sources are readily available, more convenient, and unobtrusive, and might be the only option available for some studies (Saunders et al., 2015).

There are disadvantages to using secondary data. First, the data were collected for a specific purpose that may not necessarily align with the subject study's purpose, possibly making extracting the data challenging (Saunders et al., 2015). Second, the use of a secondary data source may mean skipping some research processes, such as developing a sampling design, designing an instrument, collecting, entering, and cleaning data, and building a database (Saunders et al., 2015). However, this leaves more time to interpret and analyze the data once it is obtained (Saunders et al., 2015). The data source

required careful evaluation to assure that: (a) I could answer my research question; (b) benefits outweighed the costs; and (c) I had access (Saunders et al., 2015). All three requirements were met.

Data Analysis

The following research question and hypothesis were analyzed in this study.

Quantitative Research Question

What is the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange?

Hypotheses

Null hypothesis (H_0): There is no significant relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Alternative hypothesis (H_1): There is a significant relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange.

Based on secondary data collected from organizations listed on the Nigerian Stock Exchange website, I created an Excel data matrix and coded each organization with a letter code for each industry and a number code for each organization. I imported the Excel spreadsheet containing the codes and data values into SPSS version 27.0 for statistical analysis. The goal was to accept or reject the null hypothesis. The relationship between human capital, productivity and profitability among organizations listed on the Nigerian Stock Exchange was confirmed if the statistical analysis resulted in the rejection

of the null hypothesis. An insignificant or negative result would indicate a lack of relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange, and acceptance of the null hypothesis.

I used standard multiple linear regression $\alpha = .05$ (two-tailed) to examine the efficacy of human capital and productivity in predicting profitability in this study. Researchers use multiple linear regression as a statistical technique to describe how a numerical dependent variable is related to two or more predictor variables based on an equation and error term called the multiple regression model (Anderson et al., 2014; Plonsky & Ghanbar, 2018). Standard multiple regression is useful in revealing the estimated influence of each predictor variable on the dependent variable and enables the researcher to estimate the variance in a dependent variable that is accounted for by the relevant set of predictor variables (Plonsky & Ghanbar, 2018). There are two numerical predictor variables in this study, human capital, and productivity, and one numerical dependent variable, profitability. Thus, multiple linear regression was appropriate for use in determining how the predictor variables (human capital and productivity) relate to the dependent variable (profitability).

Variables must be appropriately matched to analytical techniques (Corner, 2002). Furthermore, analytical techniques must be a good fit for the types of measures under study (Corner, 2002). According to Corner (2002), ordinary least squares regression and correlations are required for a single dependent variable that is continuous, with predictor variables that are also continuous. Analysis of variance (ANOVA) is used if the predictor variables are categorical (Corner, 2002). ANOVA may be used for analysis of a single

dependent variable that is categorical, together with categorical predictor variables (Corner, 2002). A categorical dependent variable with continuous measures would require the use of logistic regression (Corner, 2002). Multiple dependent variables require the use of analytical techniques such as structural equation modeling and MANOVA (Corner, 2002). This study utilized a single dependent variable with continuous measures, together with two predictor variables with continuous measures. The three variables are based on a ratio scale of measurement, so ordinary least squares regression and correlations were appropriate.

Data Cleaning and Screening

Data Cleaning

Data cleaning transforms a raw data set into a clean data set by addressing unexpected duplicates, missing values, and similar errors. To avoid incorrect results and conclusions, data must be checked for errors, and the errors corrected (Huebner et al., 2018; Saunders et al., 2015). Data cleaning includes the use of visual diagrams (such as histograms and scatterplots) to help identify patterns, inconsistencies, and out-of-order items (Huebner et al., 2018). Additionally, a database that is carefully designed can facilitate checking of the data during data entry. To avoid bias during data cleaning, the researcher must avoid analysis that addresses the research question directly (Huebner et al., 2018).

Data Screening

Data screening is the process of understanding the properties of the data in preparation for data analysis (Huebner et al., 2018). This process involves visualizing the

data to discern relationships without addressing the hypothesis (Huebner et al., 2018).

Histograms, Q-Q plots, scatterplots, and P-P plots may be used to clarify the properties of data, such as outliers, skewness, and missing items. In this way, the data screening process confirms the validity of a data set for the expected statistical analysis (Huebner et al., 2018). If expected properties, such as normality are violated, the researcher may be unable to use the desired statistical method.

Missing Data

Missing data can negatively affect results (McKnight & McKnight, 2011); thus, the reasons behind missing data must be understood. When the reasons for missing data are understood, unbiased results may be achieved even when the proportion of missing data is large (Madley-Dowd et al., 2019). Missing data can either be excluded during data analysis or estimated and included in the analysis, particularly if the dataset is small. A small dataset was not expected to give a better statistical result. One of the ways to estimate missing secondary quantitative data is through regression analysis where the regression equation is fitted to estimate the missing data. The Nigerian Stock Exchange started archiving audited financial statements on the website in 2011 (Nigerian Stock Exchange, 2020). Data for the years 2005 through 2010 were unavailable. Due to many missing items, missing data were excluded from the analyses.

Data Assumptions

To examine the efficacy of human capital and productivity in predicting profitability based on the regression equation, data were evaluated in SPSS Version 27.0 to assure that assumptions are met. For every statistical model there are assumptions (Hu

& Plonsky, 2021). Checking these assumptions may require the use of visual techniques, such as scatterplots and histograms (Hu & Plonsky, 2021). The process of verifying assumptions enables the researcher to avoid inaccuracy and bias in the research (Hu & Plonsky, 2021; Saunders et al., 2015). Hu and Plonsky emphasized the importance of transparency in recording findings as well as any accommodations made in the process of examining assumptions. When assumptions are violated, the data may be transformed, bootstrapping may be employed, or outliers may be removed, and for non-linear models, logistic regression may be used (Pek et al., 2018). The basic assumptions associated with the linear regression model are first, that the dependent variable is continuous (Tranmer & Elliot, 2008). Other assumptions include multicollinearity, normality, linearity, outliers, homoscedasticity, and sample size (Hu & Plonsky, 2021). These assumptions are presented in detail below.

Multicollinearity

Multicollinearity represents significant linear collinearity among predictor variables. When predictor variables are not independent of each other, multicollinearity is present (Reddy & Sarma, 2015). Multicollinearity can result in incorrect results in linear regression analysis (Kim, 2019). Data was carefully coded to avoid multicollinearity (Kim, 2019). Additionally, a large sample size was expected to reduce multicollinearity in the data set (Kim, 2019). Variables that are found to be multicollinear may be combined to form a hierarchy that can reduce multicollinearity (Kim, 2019), or ridge regression may be used (Bradley, 2017, May 8). Correlations were conducted to determine the independence of the predictor variables at a level greater than .7 (Grande,

2015). Multicollinearity is present when the variance inflation factor (VIF) is 5 to 10 or above (Kim, 2019; Reddy & Sarma, 2015). According to Kim, when predictor variables are scrutinized for multicollinearity, a more reliable multiple linear regression model is obtained.

Normality

Data for the predictor and dependent variables are assumed to be normally distributed. Non-normality is often encountered among studies in social science (Pek et al., 2018). If violations are noted, data may be transformed. However, transformations can cause a change in the variable scale, which can interfere with the interpretation of the data (Pek et al., 2018; Reddy & Sarma, 2015). In linear regression analysis, a sufficiently large sample size may not require an assumption of normal distribution (Lumley et al., 2002; Pek et al., 2018). If the sample size is large, normality becomes a less critical aspect of the least square's linear regression model with regards to financial data (Lumley et al., 2002). Normal probability plots (Q-Q) were used to examine the normality of the regression standardized residual for continuous data (Chantarangsi et al., 2018).

Linearity

A linear relationship between the dependent and predictor variables is assumed. This assumption is not always true and must be verified (Tranmer & Elliot, 2008). Scatter plots were used to confirm nonlinearity by scrutinizing between every predictor and criterion variable (Green & Salkind, 2017). The plot shows the distribution of points for the standardized residuals against predicted values and reveals the shape of the data. A straight line indicates a linear relationship (Palmgren & Nanakorn, 2019). Data values

that violate the assumption of linearity may be transformed (Tranmer & Elliot, 2008). However, due to the financial nature of this study data transformations were inappropriate (Lumley et al., 2002).

Outliers. Multiple linear regression is sensitive to the effects of outliers (Li & Eby, 2018; Oyeyemi et al., 2015; Reddy & Sarma, 2015). Outliers are observations that are numerically distant from, or inconsistent with the data in question (Oyeyemi et al., 2015). Outliers usually highlight a problem or error, but may also transmit important information (Oyeyemi et al., 2015). While the removal of outliers can improve the fit of a regression model, removal without good reason can impact the validity of the research (Oyeyemi et al., 2015). Outliers should not be eliminated unless there is important information that suggests the need to remove the data points, such as data points containing irrelevant information (Oyeyemi et al., 2015). There are two ways to identify outliers (Ampanthong & Suwattee, 2009, March 18–20; Grande, 2015, October 28): (a) Graphically by examining scatterplots or P-P plots; and (b) analytically, based on standardized residuals. Standardized residuals outside the bounds of -3 and +3 indicate potential outliers (Bradley, 2017, May 8; Grande, 2015, October 28).

Homoscedasticity

Homoscedasticity is the extent to which equal variances are observed in the data values among the predictor and criterion variables (Yang, 2012). Error terms should be equal along the regression line (Reddy & Sarma, 2015). Heteroscedasticity, the opposite of homoscedasticity (or unequal variances), may occur when the variance is functionally related to the mean of the dependent variable, which would change with changes among

the predictor variables (Yang, 2012). Homoscedasticity can be examined using scatterplots of the regression standardized residual (Yang, 2012). The dots should be scattered throughout the scatterplot with no visible pattern noted (Tranmer & Elliot, 2008). When the assumption of homoscedasticity is not met, data may be transformed or weighted least squares regression may be used (Bradley, 2017, May 8). Graphical tests may be supplemented with statistical tests (Bradley, 2017, May 8; Yang, 2012).

Sample Size

At least 20 records are required for each predictor variable, assuming the dependent variable is normally distributed (Bradley, 2017, May 8; Grande, 2015, October 28). This study contains two predictor variables, which means 40 records are required, assuming the data is normally distributed (Grande, 2015, October 28). The *a priori* power analysis indicated a minimum sample size of 68 to achieve a statistical power of .80 (Appendix E). Increasing the statistical power to .99 revealed a sample size of 146 (MacUpdate, 2020, March 31). If normality is not met, a larger sample size is required (Grande, 2015, October 28). Standard errors of the regression coefficients are reduced with a large sample size (Kim, 2019).

Effect Size

Tests of significance (p-value) can be augmented with tests for effect size. The effect size helps to provide evidence of statistical significance, along with the p-value, in justifying the null hypothesis (Maiti & Saikia, 2019). The rejection of a null hypothesis when it is true (Type 1 error), or the acceptance of a null hypothesis when it is false (Type 2 error), based on the benchmark of $p < .05$, can lead to false conclusions.

Although this is not as critical in tests of relationship, as it is in causation tests, it is still of concern (Maiti & Saikia, 2019). The p -value test occurs as a trade-off between the magnitude of the effect, and the size of the sample. Significance occurs due to the magnitude of the effect, or with a large sample size assuming a small effect (Maiti & Saikia, 2019). *A priori* calculation power analysis for sample size provides a p -value of the desired magnitude effect (Maiti & Saikia, 2019). Managing the possibility of a type 2 error (β) at $P \geq 0.8$ reduces the probability of a type 2 error (Maiti & Saikia, 2019). It is desirable to incorporate both the test of significance (p) and the effect size (P) as interpretations of the effect size measure (Maiti & Saikia, 2019).

In multiple linear regression, the effect size is measured using the coefficient of determination (R^2) (Maiti & Saikia, 2019). The coefficient of determination (R^2) measures the effect of the linear relationship between a dependent variable and the predictors, while the adjusted R^2 corrects R^2 by measuring the sufficiency of the variance in an additional predictor variable to the regression model (Maiti & Saikia, 2019). Although care should be taken in interpreting R^2 in multiple linear regression, a small effect size is 0.0196, a medium effect size is 0.130, and a large effect size is 0.260 (Maiti & Saikia, 2019).

Partial Correlations. To assess the relative effect of the predictors on the dependent variable, a partial correlation was used to test the hypothesis as a common cause hypothesis. The partial correlation was used to explain why human capital resulted in profitability, with productivity as a mediating variable. Partial correlations range from -1 to $+1$ and are interpreted as follows: A positive sign indicates that increases in human

capital result in increases in profitability. A negative sign indicates an inverse relationship; that is, that increases in human capital result in decreases in profitability (Green & Salkind, 2017). Ranging from -1 to $+1$, a positive sign in the partial correlation indicates that increases in human capital result in increases in profitability. A negative sign indicates an inverse relationship. Assumptions with regards to the test of significance for a partial correlation coefficient are:

- Each variable is normally distributed in the population, without consideration of the other variables, as well as within every combination of the other variables (Green & Salkind, 2017). This indicates that the statistical relationship among the variables is linear (Green & Salkind, 2017). A scatterplot was used to examine the relationship for linearity.
- Each case was represented by a random sample of the population
- Scores for each case were independent of variable scores for the other cases (Green & Salkind, 2017).

Software

Data collected for each organization by year was captured using Excel spreadsheets. The data were used to calculate HCROI, output-based method, and ROA. The results were transferred to the Statistical Package for Social Sciences (SPSS) for Windows and Macintosh 8th edition or SPSS Version 27.0, for analyses. SPSS is user-friendly, versatile, and widely used for statistical analysis (Opie, 2019).

Study Validity

Although there are no guarantees, a good research design minimizes the chances of getting the wrong answer. Positivist philosophers use validity to judge the quality of research (Saunders et al., 2015). Conversations regarding validity address concerns about whether the evidence and conclusions can stand up to scrutiny (Saunders et al., 2015). Good quantitative research can stand up to scrutiny by other researchers.

Internal Validity

Common method bias can be of concern in organizational performance studies (Garavan et al., 2019). Common method bias may hinder the inference of relationships between the predictor variables and the dependent variable when data is provided from a single informant (Garavan et al., 2019). However, different sources of information can threaten validity, due to potential measurement differences (Smith, 2011). Annual independent audits are required for the financial statements of organizations listed on the Nigerian Stock Exchange. Thus, the data were considered reliable.

External Validity

External validity refers to the extent study findings can be generalized to larger populations and applied to different settings (Saunders et al., 2015). It is concerned with whether the samples taken for the study are representative of the population from which they were taken. External validity is related to a sampling strategy. Probability sampling strategies such as random sampling enhance external validity because a probability sample is expected to be representative of the population. On the other hand, non-

probabilistic sampling strategies can hinder external validity. Because there was no sampling strategy in this study, external validity did not apply.

Studies in the organizational performance field are usually conducted in Europe and America (Bainbridge et al., 2017). Bainbridge et al. (2017) called for more studies in underrepresented areas, such as Africa, and highlighted the importance of contextualized studies for the region. Although multi-industry studies are more generalizable, Bainbridge et al. called for single-industry studies at the level of analysis that could provide a contextual view, with customized variables and better measurement precision. A lack of industry context can make it difficult for practitioners to understand how the research impacts their industry (Bainbridge et al., 2017). Industry analysis was conducted using data from the Nigerian Stock Exchange website (Appendix D). Contextualizing the study highlighted the effectiveness of prior generalization from studies in America and Europe. Within industries, larger organizations have more employees, meaning that practices would vary based on the size of the organization (Bainbridge et al., 2017). The ROA calculation for profitability was used to account for organization size in the data for organizations listed on the Nigerian Stock Exchange.

Statistical Conclusion Validity

Statistical conclusion validity is the confirmation that the statistics conducted support conclusions made by the researcher (Price et al., 2015). To assure statistical conclusion validity, effect sizes are an essential part of well-conducted research (Garavan et al., 2019). The proper analysis determines whether the predicted relationship is found, while the number of participants determines the effect size (Price et al., 2015). The effect

size was measured using the coefficient of determination (R^2) for linear regression analysis (Maiti & Saikia, 2019). Additionally, effect sizes were obtained through partial correlations that were used to assess the relative effects of individual predictors with productivity as a common cause hypothesis (Green & Salkind, 2017).

Transition and Summary

In section 2, I discussed the methodological procedures for examining the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. The purpose statement was restated followed by an articulation of the role of the researcher. The participants in the study were presented, followed by the study's research method and design, the population and sampling, and ethical research. Concerns, that emerged throughout the research process were addressed from an ethical perspective (Saunders et al., 2015). Instrumentation followed, then the data collection technique, data analysis, and the study validity. In section 3, I present the findings and the application of the study to professional practice, as well as its implications for social change and recommendations for further action. The study concludes with recommendations for further research, reflections, and the conclusion.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative correlational study was to examine the relationship between human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. The predictor variables were human capital and productivity. The dependent variable was profitability. To test the relationships, I used SPSS Version 27.0. The model was able to significantly predict profitability: $F(2, 833) = 79.35, p < .01, R^2 = .158$. The $R^2 (.158)$ value indicated that approximately 16% of variations in profitability are accounted for by the linear combination of the predictor variables (human capital and productivity). The predictor variable human capital was statistically significant ($t = 12.548, p < .01, \beta = .400$), accounting for a higher contribution to the model. The predictor variable productivity was not significant.

Presentation of the Findings

In this section, I present descriptive statistics, discuss testing of the assumptions, present inferential statistics results, provide a theoretical conversation with regards to the findings, and summarize.

Descriptive Statistics

Audited financial statements for 169 organizations were used in this study for a total of 836 records (Table 1). The Nigerian Stock Exchange started archiving audited financial statements on the website in 2011 (Nigerian Stock Exchange, 2020). As a result, data for the years 2005 through 2010 were unavailable. Due to the large number of

missing items, missing data were excluded from the analysis. This caused available data records (*N*) to vary for the study variables (Table 1). The data were organized in a Microsoft Excel spreadsheet with rows representing each organization coded by a number and a letter for the organization's industry. Columns were created for the code, year, total assets, total revenue, total expenses, and derived profit and loss. The profit or loss was reconciled to each organization. Columns were added for interest, depreciation, and extraordinary items to calculate EBITDA. Pay and benefits, and number of employees completed the columns of data that were used to calculate ratios for the study variables. Three columns were added to calculate the ratios: HCROI, output-based, and ROA. Table 1 presents descriptive statistics for the study variables, human capital (HCROI), productivity (output-based), and profitability (ROA).

Table 1

Descriptive Statistics for Quantitative Study Variables

| Variable | N | Minimum | Maximum | Mean | Std. Dev |
|--------------------|------|---------|------------|-----------|----------|
| HCROI | 956 | -68.14 | 312.25 | 1.193 | 12.129 |
| Output-based | 839 | -760.68 | 5167267.28 | 110305.91 | 389987.8 |
| ROA | 1184 | -5.254 | 3.829 | 0.063 | 0.308 |
| Valid N (listwise) | 836 | | | | |

Table 2 presents frequencies by industry. The 169 organizations were represented by nine industries. Financial service organizations were the most frequent, followed by organizations in the service industry.

Table 2*Frequency of Organizations by Industry Code*

| Code | Name | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------|-----------|---------|---------------|--------------------|
| A | Oil and Gas | 180 | 7.1 | 7.1 | 7.1 |
| B | Financial Services | 795 | 31.4 | 31.4 | 38.5 |
| C | Services | 375 | 14.8 | 14.8 | 53.3 |
| D | Information Technology | 150 | 5.9 | 5.9 | 59.2 |
| E | Conglomerates | 135 | 5.3 | 5.3 | 64.5 |
| G | Industrial Goods | 225 | 8.9 | 8.9 | 78.7 |
| H | Agriculture | 75 | 3 | 3 | 81.7 |
| K | Healthcare | 165 | 6.5 | 6.5 | 88.2 |
| M | Consumer Goods | 300 | 11.8 | 11.8 | 100 |
| Total | | 2535 | 100 | 100 | |

Tests of Assumptions

The sample size for this study ($N = 836$) was larger than the required sample size of 68. Assumptions of multicollinearity, normality, linearity, outliers, homoscedasticity, independence, and sample size were evaluated.

Multicollinearity

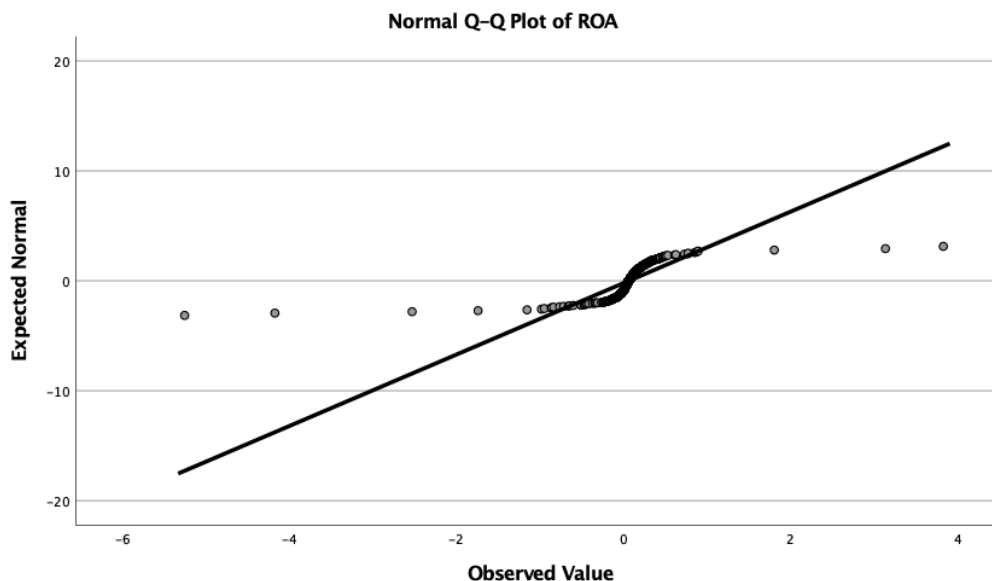
Multicollinearity was evaluated by viewing the correlation coefficients among the predictor variables (Table 3). A lack of correlation among the predictor variables at a level greater than .7 is required (Grande, 2015, October 28). The bivariate correlation (.098) was small. Furthermore, the VIF (Table 6) was 1.01. Thus, violation of the assumption of multicollinearity was not evident.

Table 3*Correlation Coefficients Among Study Predictor Variables*

| Test | Analysis | <i>N</i> | ROA | HCROI | Output-based |
|---------------------|--------------|----------|-------|-------|--------------|
| Pearson Correlation | ROA | 836 | 1 | 0.400 | 0.035 |
| | HCROI | 836 | 0.400 | 1 | 0.098 |
| | Output-based | 836 | 0.035 | 0.098 | 1 |
| Sig. (1-tailed) | ROA | 836 | . | 0.000 | 0.154 |
| | HCROI | 836 | 0.000 | . | 0.002 |
| | Output-based | 836 | 0.154 | 0.002 | . |

Normality

Normality was evaluated using a normal probability plot (Q-Q) of ROA (Figure 2). If on the plot, the points lie in a reasonably straight-line diagonally from the bottom left to the top right, there is supportive evidence for the assumption of normality (Green & Salkind, 2017). Examination of the Q-Q plot revealed violations of the assumption of normality with skewed normality curves and outliers. Although non-normal data may be transformed to attempt to establish normality, transformations can cause a change in the variable scale, which can interfere with interpretation of the data (Pek et al., 2018; Reddy & Sarma, 2015).). With a sufficiently large sample size, normality becomes a less critical aspect of the least squares' linear regression model specifically with regards to financial data (Lumley et al., 2002; Pek et al., 2018). Based on $N = 836$ in this study, I proceeded with the analysis.

Figure 2*Normal Q-Q Plot of ROA****Linearity, Outliers, Homoscedasticity, Independence, and Sample Size***

Linearity, outliers, and homoscedasticity were examined using a scatterplot of the standardized residuals (Figure 3). The dots should be scattered throughout the scatterplot with no visible pattern noted (Bradley, 2017, May 8; Tranmer & Elliot, 2008). Thus, the scatterplot reveals non-linearity. Data clusters indicate violation of the assumption of homoscedasticity. Homoscedasticity is the extent to which equal variances are observed in the data values among the predictor and criterion variables (Yang, 2012). Standardized residuals outside the bounds of -3 and +3 indicate potential outliers (Bradley, 2017, May 8; Grande, 2015, October 28; Palmgren & Nanakorn, 2019). The scatterplot reveals extreme outliers. Outliers usually highlight a problem or error, but may also transmit important information (Oyeyemi et al., 2015). While removal of the outliers can improve the fit of the regression model, removal without good reason can impact the validity of

the research (Oyeyemi et al., 2015). Reasons for removing outliers include data points containing irrelevant information (Oyeyemi et al., 2015). The shape of the data in this study is based on recorded financial data from a large sample. Thus, I did not remove outliers. The Durbin-Watson test for independence in a multiple regression analysis revealed relative independence among the predictor variables (.971) (Table 4).

Independent error terms should remain within the bounds of 0.5 and 2.5 (Bradley, 2017, May 8). Standard errors of the regression coefficients are reduced with a large sample size (Kim, 2019). A minimum sample size of $N = 68$ was required for this study (Appendix E). Data from the audited financial statements of the 169 organizations in this study ($N = 836$) exceeded the required minimum sample size. Thus, I proceeded with testing.

Figure 3

Scatterplot of ROA

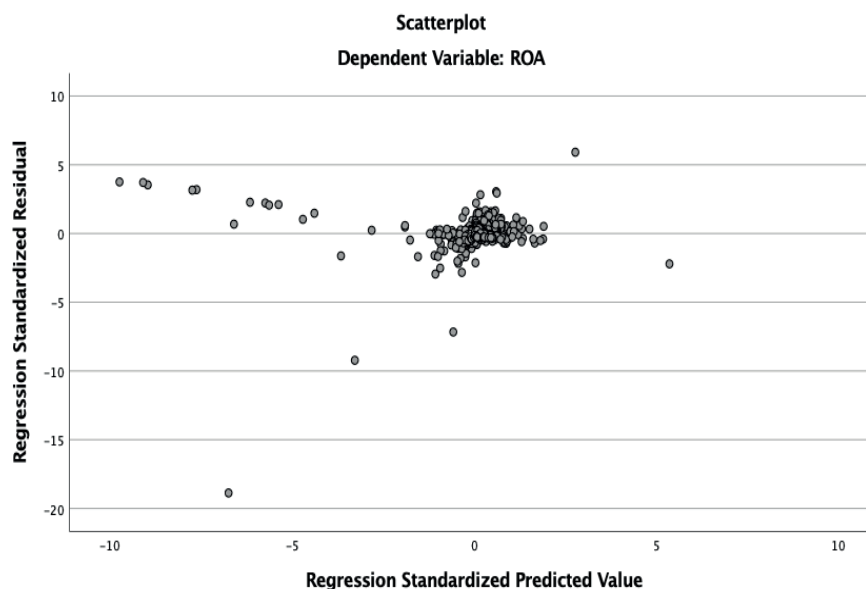


Table 4*Multiple Regression Model Summary*

| Model Summary ^b | | | | | |
|----------------------------|------|----------|-------------------|----------------------------|---------------|
| Model | R | R Square | Adjusted R square | Std. Error of the estimate | Durbin-Watson |
| 1 | .400 | 0.160 | 0.158 | 0.243487 | 0.971 |

a Predictors: (Constant), Output-based, HCROI

b Dependent Variable: ROA

Inferential Results

I used standard multiple linear regression $\alpha = .05$ (two-tailed), to examine the efficacy of human capital and productivity in predicting profitability. The predictor variables were human capital and productivity. The dependent variable was profitability. The null hypothesis was that there is no statistically significant relationship between human capital, productivity, and profitability. The alternative hypothesis was that there is a statistically significant relationship between human capital, productivity, and profitability. Preliminary analyses to assess whether assumptions of multicollinearity, normality, linearity, outliers, homoscedasticity, independence, and sample size revealed violation of assumptions of normality, linearity, outliers, and homoscedasticity (see *Tests of Assumptions*). Due to the large sample size ($N = 836$) and the financial nature of the study data, I proceeded with multiple linear regression tests.

The model was able to significantly predict profitability: $F(2, 833) = 79.35, p < .01, R^2 = .158$ (Tables 4, 5 & 6). The $R^2 (.158)$ value indicated that approximately 16% of variations in profitability are accounted for by the linear combination of the predictor variables (human capital and productivity). The predictor variable human capital was statistically significant ($t = 12.548, p < .01, \beta = .400$), accounting for a higher

contribution to the model (Table 6). The predictor variable productivity was not significant. The final predictive equation was profitability = .053 + .015(human capital) - 0.00 (productivity) (Table 6). The combination of a significant ANOVA model ($p < .01$) and the coefficients, support the model prediction (Table 5).

Table 5*Model Summary – ANOVA*

| | | ANOVA ^a | | | | |
|-------|------------|--------------------|-----|-------------|--------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 9.444 | 2 | 4.722 | 79.346 | .000 ^b |
| | Residual | 49.572 | 833 | 0.060 | | |
| | Total | 59.016 | 835 | | | |

a Dependent Variable: ROA

b Predictors: (Constant), Output-based, HCROI

Table 6*Model Summary – Coefficients*

| 1 | Model | Unstandardized Coefficients | | Standard Coeff | t | Sig. | Correlations | | | Collinearity Statistics | | |
|---|--------------|-----------------------------|------------|----------------|--------|-------|--------------|---------|---------|-------------------------|-------|--|
| | | B | Std. Error | | | | Zero-order | Partial | Partial | Tolerance | VIF | |
| | (Constant) | 0.053 | 0.009 | | 6.024 | 0.000 | | | | | | |
| | HCROI | 0.015 | 0.001 | 0.400 | 12.548 | 0.000 | 0.400 | 0.399 | 0.398 | 0.990 | 1.010 | |
| | Output-based | 0.000 | 0.000 | -0.004 | -0.120 | 0.904 | 0.035 | - | - | 0.990 | 1.010 | |

Human Capital

The positive slope for human capital (HCROI) (.015) (Table 6) as a predictor of profitability indicated there was about a .015 increase in profitability for each 1-point

increase in human capital. Thus, profitability tends to increase as human capital increases. The squared semi-partial coefficient (sr^2) that estimates how much variance in profitability is uniquely predictable from human capital (HCROI) is .399, indicating that 39.9% of the variance in profitability is uniquely accounted for by human capital when productivity is controlled.

Other Tests

Partial Correlations. To assess the relative effect of human capital on profitability, I proceeded with partial correlations, given the sample size, to test the hypothesis as a common cause hypothesis (Table 7). The purpose of the partial correlation was to explain why human capital results in profitability, with productivity as a mediating variable. The partial correlations between human capital and profitability ($r = .399, p = .000$) when productivity is controlled, indicated that productivity significantly explains the role of human capital in generating profits. When analyzed by industry, productivity was a mediating variable in all industries except the conglomerates industry (Table 8).

Table 7

Partial Correlations – All Industries While Controlling for Productivity

| Control Variables | | | ROA | HCROI |
|-------------------|-------|-----------------|-------|-------|
| Output-based | ROA | Correlation | 1.000 | 0.399 |
| | | Sig. (2-tailed) | . | 0.000 |
| | | df | 0 | 833 |
| | HCROI | Correlation | 0.399 | 1.000 |
| | | Sig. (2-tailed) | 0.000 | . |
| | | df | 833 | 0 |

Table 8*Partial Correlations by Industry While Controlling for Productivity*

| Industry | Partial Correlation | Significance | Result |
|--------------------|---------------------|--------------|---|
| All Industries | 0.399 | $p = 0.000$ | Strong, positive, statistically significant ($p < .01$) |
| Construction | 0.645 | $p = 0.001$ | |
| Consumer Goods | 0.654 | $p = 0.001$ | |
| Financial Services | 0.204 | $p = 0.001$ | |
| Healthcare | 0.676 | $p = 0.001$ | |
| Industrial Goods | 0.647 | $p = 0.001$ | |
| Information | | | |
| Technology | 0.653 | $p = 0.001$ | |
| Oil & Gas | 0.837 | $p = 0.001$ | |
| Services | 0.573 | $p = 0.001$ | |
| Agriculture | 0.472 | $p = 0.023$ | Positive, statistically significant ($p < .05$) |
| Conglomerates | 0.265 | $p = 0.050$ | Not statistically significant |

Year-Over-Year Analysis

Year-over-year correlation analyses based on the nonparametric Spearman's Rank correlation coefficient (Spearman, 1961), were conducted to determine the effect of increasing years on the variables. The correlation between number of years and productivity was statistically significant ($p < .01$) (Table 9). This indicated that productivity increases with increasing years in business. The year-over-year analysis failed to reveal a statistically significant relationship between number of years and human capital (HCROI), and number of years and profitability (ROA).

Table 9*Correlation Coefficients Among Study Variables Over Years*

| Variable | Year | ROA | HCROI | Out based | |
|----------|-------------------------|------|-------|-----------|---------|
| Year | Correlation Coefficient | 1 | 0.005 | 0.013 | **0.183 |
| | Sig. (2-tailed) | . | 0.872 | 0.690 | 0.000 |
| | <i>N</i> | 2535 | 1184 | 956 | 839 |

** $p < .01$

Analysis Summary

The purpose of this study was to examine the efficacy of human capital and productivity in predicting profitability. I used standard multiple linear regression to examine the ability of human capital and productivity to predict profitability. Assumptions for multiple linear regression were assessed with violations noted (see *Tests of Assumptions*). Because the data was large and represented financial results, I proceeded with the regression analysis. The model was able to significantly predict profitability: $F(2, 833) = 79.35, p < .01, R^2 = .158$. Human capital provides useful predictive information about profitability. The conclusion from the analyses in this study is that human capital is significantly associated with profitability among organizations listed on the Nigerian Stock Exchange, in line with the alternative hypothesis. Although the correlation between productivity and profitability was not significant, based on partial correlations, productivity mediates the relationship between human capital and profitability. Additionally, year-over-year analyses (Table 9) revealed that productivity increases with experience.

Theoretical Conversation on Findings

The findings in this study confirm research conducted by Andreeva and Garanina (2016). Andreeva and Garanina found that human capital positively influences organizational performance among Russian manufacturing companies. Hashim et al. (2015) found that human capital as a part of intellectual capital, significantly influences organizational performance among organizations in Malaysia. Based on a study by Lufungula and Borromeo (2019), increased human capital resulted in increased organization performance among healthcare institutions in the Democratic Republic of Congo. The present study confirms these findings. Human capital in the aggregate measured by returns, predicts profitability among organizations listed on the Nigerian Stock Exchange. Škuflić et al. (2016), examined the relationship between indebtedness, concentration, liquidity, productivity, and profitability among Croatian manufacturing companies and found a positive and significant relationship between productivity and profitability. The ability to deploy human capital in creating innovative conditions that develop new business is critical if human capital is to have a profound effect on production processes and results (Danquah & Amankwah-Amoah, 2017). The measurement of productivity can be classified as operational performance in contrast to the measurement of profitability, which is classified as financial performance (Kuncová et al., 2016). Operational effectiveness does not always translate into greater profitability (Porter, 1996). Profitability relies on organizational strategy as well as operational effectiveness (Porter, 1996). One or more of these factors may have contributed to lack of significance of the Productivity variable in this study.

In this study, I measured productivity at the organizational level. Productivity may be measured at the unit, the organization, or the system level (Kämäräinen et al., 2016). Kämäräinen et al., argued that productivity should be viewed holistically across all three levels and is best measured at the system level. Thus, I performed partial correlations by industry (Table 9). The partial correlations confirmed productivity as a mediating variable in the relationship between human capital and profitability (Table 8). The partial correlations confirmed that productivity mediates the relationship between human capital and profitability.

I dug a little deeper to find out why productivity failed to predict profitability in the present study. I conducted a correlation analysis by industry in Nigeria (Appendix D), which revealed a positive and significant correlation between productivity and profitability for most industries in Nigeria. The correlation between productivity and profitability in the construction and information technology industries was not significant, and the correlation for the service industry was statistically significant and negative. Danquah and Amankwah-Amoah (2017) found negative productivity growth among countries in sub-Saharan Africa (SSA). Based on a study conducted by the World Bank (2020, November 3) Nigeria ranked 152 out of 157 countries in productivity. Thus, productivity among organizations listed on the Nigerian Stock Exchange can potentially be improved. Year-over-year analyses revealed that productivity improves with experience (Table 9).

Human capital theory holds that the mix of collective knowledge, skills, and abilities obtained by an organization based on levels of employee education, on-the-job-

training, and job experience, can result in productive individuals who innovate and correctly apply technology for increased organizational revenue and decreased expenses (Becker, 1962; Benos & Karagiannis, 2016; Danquah & Amankwah-Amoah, 2017; Schultz, 1961). Investments in the training and development of human capital positively impact the financial performance of organizations (Riley et al., 2017). Human capital significantly predicted profitability among the organizations in this study. Thus, the mix of collective knowledge, skills, and abilities obtained by an organization based on levels of employee education, on-the-job-training, and job experience, in line with human capital theory, are antecedents to profitability in organizations.

Applications to Professional Practice

Human capital as a subject has not often been empirically linked with productivity. Yet, productivity is an important conversation in the business operations of every field and discipline (Boon et al., 2018). Lee et al. (2019) argued that the collective value of human capital can provide a strategic advantage for the profitability of business organizations. In this study, I sought to provide a practical model for better viewing the relationship between human capital, productivity, and profitability, as seen through the lens of human capital theory. In the final linear regression model, the predictor variable, human capital was statistically significant ($p < .01$). The findings confirmed the relationship between human capital and profitability: Increases in human capital result in increases in profitability among organizations listed on the Nigerian Stock Exchange. Human capital theory holds that the education and training of individuals is key to the collective value of human capital in organizations (Becker, 1962; Schultz, 1961). To

increase human capital, organizational leaders are encouraged to prioritize firm-specific training in organizations, while policy makers are encouraged to prioritize general education in the nation. The ROA calculation for profitability accounted for organization size as practices can vary based on the size of the organization (Bainbridge et al., 2017). Thus, the relationship between human capital and profitability may be generalized to for-profit organizations.

The relationship between productivity and profitability was not statistically significant in this study. Profitability has been linked to various factors internal and external to organizations. External factors include industry forces (Nanda & Panda, 2018). Industry forces can make profitability impossible to achieve without innovation (Nanda & Panda, 2018). Labor productivity, an internal factor, is not the only factor that can impact profitability. Increased total factor productivity is achieved when efficient operational measures are used to decrease inputs and increase outputs. Total factor productivity involves all operational requirements needed to produce goods and services profitably and is outside the scope of this study. Nevertheless, it is important to note that total factor productivity improves when organizations invest in training employees (Carrier, et al., 2019; Rocha et al., 2018). Human capital is considered synonymous with labor productivity (de Grip et al., 2020; Molloy & Barney, 2015; Russell & Taylor, 2017) and could explain how human capital is significantly correlated with profitability, while total factor productivity in this case, is not. A helpful predictive model that encourages organizational leaders to view costs of hiring and developing employees as investments in future profitability can encourage increased investments in employees.

Partial correlations were conducted to explain the role of human capital in profitability, with productivity as a mediating variable. The results indicated that productivity significantly ($p < .01$) explains the role of human capital in generating profits (Table 7). When analyzed by industry, partial correlations revealed productivity as a mediating variable in all industries except the conglomerates industry (Table 8). Bainbridge et al. called for single-industry studies at the level of analysis, which could provide a contextual view, with customized variables and better measurement precision. Within industries, larger organizations have more employees, meaning that practices could vary based on the size of the organization (Bainbridge et al., 2017). The industry analysis (Appendix D) revealed no statistically significant relationship between productivity and profitability in Nigeria's construction and information technology industries, and a statistically significant and negative relationship in Nigeria's service industry. Variations by industry confirm that profitability may be impacted by industry forces (Porter, 2008; Rizea, 2015). Thus, industry profitability should be viewed in context. Organizational leaders and policy makers in Nigeria should review plans for the development of human capital, particularly in the service, construction and information technology industries and implement initiatives for firm-specific and general education, for increased human capital that may result in increased productivity in Nigeria.

Implications for Social Change

The findings in this study confirm a significant relationship between human capital and profitability. To stay in business in the long run, organizations must be profitable (Sogue & Akçaöz, 2018). The findings are expected to encourage policy

makers, in collaboration with business leaders, to increase funding for the development of skilled, productive, well-educated individuals, who can support the growth of human capital in the nation. A partnership exists between business organizations, the country, and regional economies to supply a well-educated skilled workforce that can be further developed for valuable use within organizations. Productive nations can compete for more customers and in the process improve the lives of their citizens (Russell & Taylor, 2017). Nigeria is a country in sub-Saharan Africa, well-documented for having low levels of tertiary (or higher) education. Implications for social change include the potential for increased profitability and sustainability of business organizations in Nigeria (World Bank, 2019, April 11). These organizations will be better equipped to compete globally through a skilled, well-educated workforce.

Recommendations for Action

The findings in this study indicate that human capital significantly predicts profitability, and that productivity mediates the relationship. An understanding of the relationship between human capital, productivity, and profitability is expected to incentivize leaders of organizations listed on the Nigerian Stock Exchange, business leaders, and policy makers, to willingly source and invest in world-class human capital that can innovate for improved labor productivity. Because productivity was found to mediate the relationship between human capital and profitability, further research on productivity in other settings is recommended. Knowledge is the most significant asset of any organization (Danquah & Amankwah-Amoah, 2017). Individuals with tertiary education have a greater capacity to increase productivity through innovation (Danquah

& Amankwah-Amoah, 2017). Danquah and Amankwah-Amoah called for Africa to increase investments in higher education to build skills for innovation. Leaders of organizations listed on the Nigerian Stock Exchange and business leaders in general should increase investment in employee firm-specific training to increase productivity through innovative employees. According to Lee et al. (2019), human capital in organizations can provide a strategic advantage for productivity. Productivity growth is driven by innovation (Danquah & Amankwah-Amoah, 2017). Thus, innovative human capital is the key to productivity. Profitability can be elusive if knowledgeable human capital that can innovate in ways that decrease costs and increase revenues sustainably, is lacking. Policy makers in Nigeria are encouraged to increase investments in higher education and general knowledge to improve the quality of human capital in the country, particularly in the services, construction, and information technology industries.

Much of the value of human capital is hidden behind innovation. Thus, it is imperative that it be captured in a manner that is not fleeting (Roslender et al., 2015). The subjective nature of valuing human capital in financial statements poses challenges for human capital accounting (Roslender et al., 2015). Conventionally, employee costs are accounted for in the income statement as expenses that reduce profitability and expire within a given year. Business leaders may, as a result, be tempted to keep employee costs down to stabilize or increase profits (Mueller, 2019), thereby perpetuating the limitations of available human capital and a cycle of lower profitability. Organizations need to find a way to best tell the story of the growth of human capital within a given period (Roslender et al., 2015). One option is to take the pressure off profits on the income statement by

accounting for aggregate human capital in the balance sheet as an intangible asset that can be amortized over time (Akinlo & Olayiwola, 2017; Roslender et al., 2015). This is a continuing conversation that should be considered by policy makers and regulatory agencies as a viable option for accounting policy.

The results in this study may be disseminated via literature and conferences to business leaders, academic institutions, and policy makers in Nigeria and abroad, as well as among international organizations such as the World Bank and the IFRS Foundation. These stakeholders will most benefit from the recommendations in this study concerning human capital, productivity, and profitability. The knowledge obtained in this study may be further shared through training events.

Recommendations for Further Research

In this study, I limited my focus to the study of human capital, productivity, and profitability among organizations listed on the Nigerian Stock Exchange. The findings reveal that industry profitability matters (Porter, 2008; Rizea, 2015). A statistically significant relationship was not noted in this study between productivity and profitability. However, partial correlations revealed that productivity mediates the relationship between productivity and profitability, meaning that productivity may be statistically significant in a different setting. Therefore, studies that examine the relationship among the three variables in other settings are recommended. The partial correlations reveal industry variations in profitability, which confirm assertions by researchers (Kämäräinen et al., 2016; Porter, 2008) that profitability is best observed at the industry level (Table 10). The construction and information technology industries among organizations listed

on the Nigeria stock exchange reveal no significant correlation with productivity and the services industry reveals a negative correlation with profitability. Thus, contextualized studies at the industry level within Nigeria and in other countries, are recommended. Studies that infer causality between the study variables: human capital, productivity, and profitability, may clarify the influence of human capital on productivity and the influence of productivity on profitability. Human capital is present in an organization if the collective output of labor is greater than the individual output of each employee (Delery & Roumpi, 2017). The present study did not address the impact of individual output. Further research could compare collective human capital in organizations to individual human capital output.

Reflections

In my role as a chief financial officer (CFO), I have responsibility for the HR department. Thus, the conversations on human capital piqued my interest early as I researched a possible topic for my study. Most researchers agree that there is a relationship between human capital, productivity, and profitability. Some even likened human capital to productivity (Molloy & Barney, 2015; Russell & Taylor, 2017). However, few researchers tested the relationships empirically. I formulated this quantitative study out of curiosity, to examine these assertions. If true, the research could provide an avenue for solving problems we were experiencing sustaining profitability in our business. The findings in this study reveal a statistically significant relationship between human capital and profitability. I observed that human capital is not the same as productivity. Productivity is a much broader subject that involves the operational

performance of an organization. Profitability relies heavily on strategy as well as operational effectiveness (Porter, 1996). Nevertheless, productivity improves when organizations invest in training employees (Carlier, et al., 2019; Rocha et al., 2018). Armed with this understanding, I helped set up processes aligned with our business strategy that prioritized human resources. The result was sustained profits for the business. Thus, I became a consumer of my study.

Conclusion

Organizations must be profitable to survive in the long run. Researchers have affirmed the relationship between human capital, productivity, and profitability. In this study, I empirically tested this relationship among organizations listed on the Nigerian Stock Exchange. Based on human capital theory, the knowledge, skills, and abilities obtained through education and experience are key to increasing human capital and labor productivity in organizations for greater profitability and sustainability of organizations. The results confirm that increases in human capital result in increases in profitability and that productivity mediates the relationship between human capital and profitability.

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Appendix A: Frequency by Year

| | Year | | | |
|-------|-----------|---------|---------------|--------------------|
| | Frequency | Percent | Valid Percent | Cumulative Percent |
| 2005 | 169 | 6.7 | 6.7 | 6.7 |
| 2006 | 169 | 6.7 | 6.7 | 13.3 |
| 2007 | 169 | 6.7 | 6.7 | 20.0 |
| 2008 | 169 | 6.7 | 6.7 | 26.7 |
| 2009 | 169 | 6.7 | 6.7 | 33.3 |
| 2010 | 169 | 6.7 | 6.7 | 40.0 |
| 2011 | 169 | 6.7 | 6.7 | 46.7 |
| 2012 | 169 | 6.7 | 6.7 | 53.3 |
| 2013 | 169 | 6.7 | 6.7 | 60.0 |
| 2014 | 169 | 6.7 | 6.7 | 66.7 |
| 2015 | 169 | 6.7 | 6.7 | 73.3 |
| 2016 | 169 | 6.7 | 6.7 | 80.0 |
| 2017 | 169 | 6.7 | 6.7 | 86.7 |
| 2018 | 169 | 6.7 | 6.7 | 93.3 |
| 2019 | 169 | 6.7 | 6.7 | 100.0 |
| Total | 2535 | 100.0 | 100.0 | |

Appendix B: CITI Program Certificate of Completion

This is to certify that:

NeEma Eleyae

Has completed the CITI Program course:

Completion Date: 01-Sep-2020

Expiration: N/A

Date Record ID: 38032723

Verify at www.citiprogram.org/verify/?w0d3fd858-570b-4df6-b1bc-3baa2bf9a743-38032723

Appendix C: Determinants and Deterrents to Profitability

| Researcher | Year | Measure | Determinants of profitability | | | | Deterrents of profitability | | Conclusion |
|-----------------------------|------|------------|-------------------------------|-----------|----------|-------|-----------------------------|------------------|--|
| | | | Firm specific factors | | | | | | |
| | | | Firm size | liquidity | Firm age | TFP** | Leverage | Financial crisis | |
| Işık, O | 2017 | ROA | ✓ | ✓ | ✓ | | ✓ | ✓ | Larger firm-size leads to a higher ROA |
| Kuncová et al. | 2016 | ROA | ✓ | | X | | | | Economies of scale in firm-size are key |
| Nanda & Panda | 2018 | ROA/NPM*** | ✓ | ✓ | | | ✓ | | Firm specific factors determine profitability. Industry may be an important determinant of profitability |
| Škuflić et al. | 2016 | NPBT* | | | | ✓ | ✓ | | There is a significant relationship between TFP and profitability |
| *net profit before tax | | | | | | | | | |
| **total factor productivity | | | | | | | | | |
| ***net profit margin | | | | | | | | | |

Appendix D: Bivariate Correlations by Industry

D-1*Human Capital and Profitability by Industry*

| Industry | Correlation | Significance | Result |
|--------------------|-------------|--------------|---|
| All Industries | 0.607 | $p < .01$ | Strong, positive, and statistically significant |
| Agriculture | 0.819 | $p < .01$ | |
| Conglomerates | 0.668 | $p < .01$ | |
| Construction | 0.892 | $p < .01$ | |
| Consumer Goods | 0.837 | $p < .01$ | |
| Financial Services | 0.621 | $p < .01$ | |
| Healthcare | 0.670 | $p < .01$ | |
| Industrial Goods | 0.859 | $p < .01$ | |
| Information | | | |
| Technology | 0.837 | $p < .01$ | |
| Oil & Gas | 0.717 | $p < .01$ | |
| Services | 0.453 | $p < .01$ | |

D-2*Human Capital and Productivity by Industry*

| Industry | Correlation | Significance | Result |
|--------------------|-------------|--------------|---|
| All Industries | 0.406 | $p < .01$ | Strong, positive, statistically significant correlation |
| Consumer Goods | 0.359 | $p < .01$ | |
| Financial Services | 0.488 | $p < .01$ | |
| Industrial Goods | 0.419 | $p < .01$ | |
| Oil & Gas | 0.587 | $p < .01$ | |
| Healthcare | 0.332 | $p < .05$ | Positive, statistically significant correlation |
| Information | | | |
| Technology | 0.394 | $p < .05$ | |
| Agriculture | 0.478 | $p < .05$ | |
| Conglomerates | 0.333 | $p < .05$ | No statistically significant correlation |
| Construction | -0.002 | | |
| Services | 0.153 | | |

D-3*Productivity and Profitability by Industry*

| Industry | Correlation | Significance | Result |
|------------------------|-------------|--------------|---|
| All Industries | 0.172 | $p < .01$ | |
| Consumer Goods | 0.324 | $p < .01$ | Strong, positive, statistically significant |
| Financial Services | 0.183 | $p < .01$ | |
| Healthcare | 0.560 | $p < .01$ | |
| Oil & Gas | 0.362 | $p < .01$ | |
| Agriculture | 0.465 | $p < .05$ | |
| Conglomerates | 0.277 | $p < .05$ | Positive, statistically significant |
| Industrial Goods | 0.266 | $p < .05$ | |
| Construction | -0.150 | | |
| Information Technology | 0.279 | | Not statistically significant |
| Services | -0.211 | $p < .01$ | Strong, negative, statistically significant |

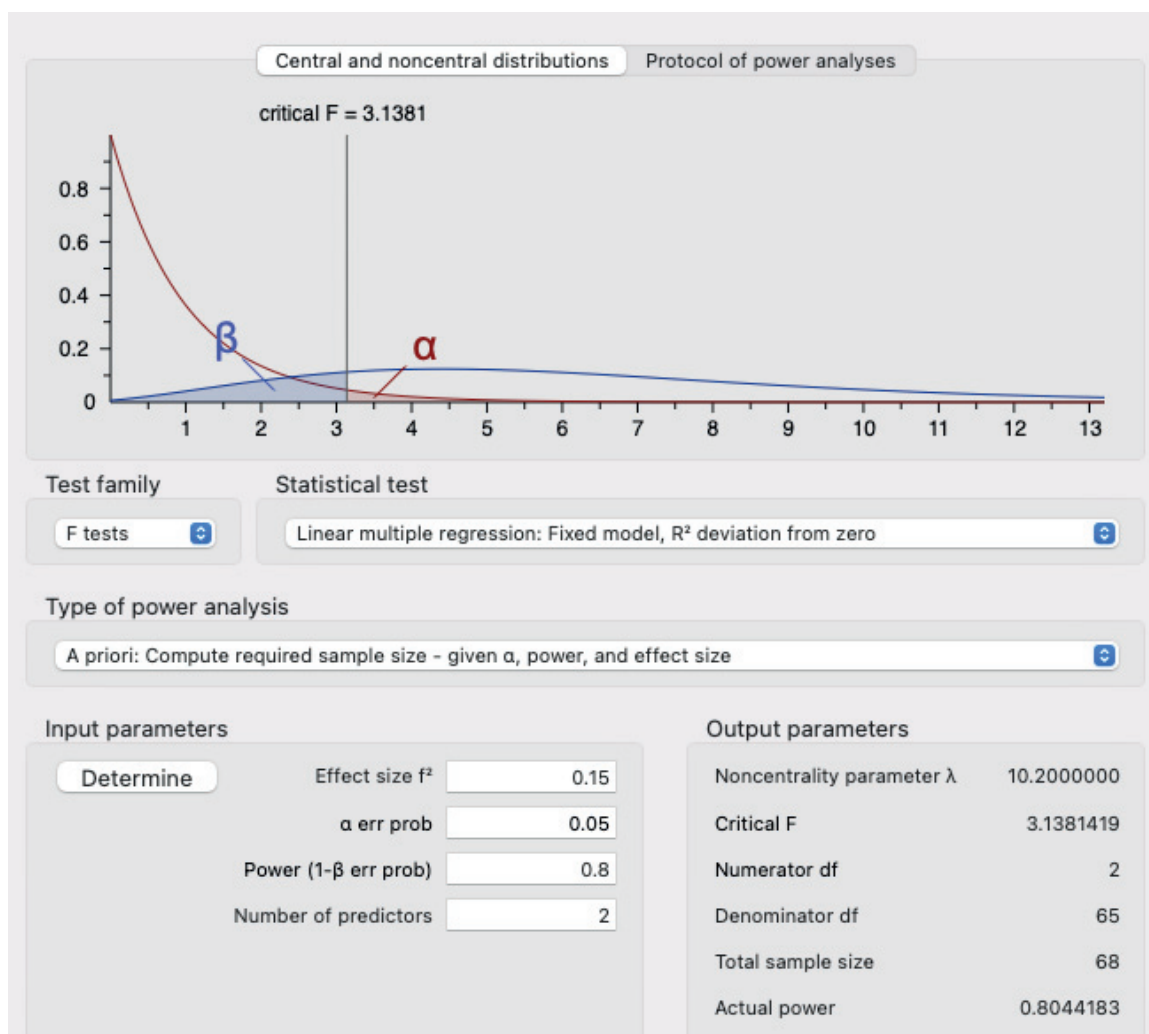
D-4*Strength of Relationship Among Variables by Industry*

| Industry | Human Capital and Productivity | Human Capital and Profitability | Productivity and Profitability |
|------------------------|--------------------------------|---------------------------------|--------------------------------|
| All Industries | ** | ** | ** |
| Consumer Goods | ** | ** | ** |
| Financial Services | ** | ** | ** |
| Healthcare | * | ** | ** |
| Oil & Gas | ** | ** | ** |
| Agriculture | * | ** | * |
| Conglomerates | * | ** | * |
| Industrial Goods | ** | ** | * |
| Construction | Not statistically significant | ** | Not statistically significant |
| Information Technology | * | ** | Not statistically significant |

| | | | |
|----------|-------------------------------|----|---|
| Services | Not statistically significant | ** | Strong, negative, statistically significant |
|----------|-------------------------------|----|---|

*Correlation is positive and statistically significant at the $p < .05$

**Correlation is strong, positive, and statistically significant at the $p < .01$

Appendix E: *A Priori* Analysis for Sample Size

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