

TECHNOLOGICAL ADVANCEMENTS AND ENTREPRENEURIAL ORIENTATION OF SMALL AND MEDIUM SCALE ENTERPRISES IN RIVERS STATE

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Abstract

This work examined the nexus amongst Technological Advancements and Entrepreneurial Orientation of SMEs in Rivers state, Nigeria. The cross-sectional survey was utilized with the aid of copies of a structured questionnaire, self-administered and retrieved from 300 entrepreneurs and employees, chosen from randomly selected SMEs in Rivers State. The mean and standard deviation of the responses to each item on the questionnaire were calculated. Kendall's Tau_b Correlation analysis was used to test the hypotheses. Proactiveness had stronger relationship with technological volition, than with technological knowledge; competitive aggressiveness correlated better with technological knowledge than with technological volition. Entrepreneurs should enhance their entrepreneurial orientation practices by introducing new lines, technology and markets; promote new ideas and design; and compete with aggression by acting proactively.

Key Words: *Technological Advancement, Entrepreneurial Orientation, Technological Knowledge, Technological Volition, Proactiveness, Competitive Aggressiveness.*

1. Introduction

An objective of many national governments is to boost entrepreneurship due to the fact that entrepreneurship generates employment and influences the economy at the regional and national levels (Cooney, 2012). Small enterprises have the ability to provide an ideal environment in which entrepreneurs can best exercise their skills and achieve their personal and professional objectives. However, many small businesses compete in a highly competitive climate with increasing risk and unpredictability in the present volatile economy (Ndirangu & Mukulu 2014). Competitors with access to far broader strategic resource pools are more flexible in managing their external activities - time for promotions, debut of new products, etc (Bianchi et al. 2012).

According to Wiklund and Shepherd (2005), entrepreneurial orientation (EO) enables small organizations to uncover new business possibilities and strengthens their distinctiveness from other companies by discovering new chances. The adoption of a business approach as a vital variable for growth-oriented small companies looks relevant because it contributes significantly to the company's performance (Mahmood & Hanafi 2013). In reality, great business performance among small business owners improves the development and activation of personal strategies that effect business growth and performance (Omisakin et al., 2016).

It is not unexpected that companies profit from the effective adoption and orientation of entrepreneurial guidance. That's because companies have to constantly search the opportunities by finding new markets and identifying new products, taking a calculated risk that brings an attractive result, competing aggressively to win competitors, and following a participatory management system that encourages employees to participate in innovation and to take a new approach. All these tasks must be carried out to boost their performance. Companies are apprehensive about their existence without taking entrepreneurial guidelines, because companies are very competitive and technology and other environments change quickly.

The technological advances change our purchases, sales, socialization, learning, development, working, governance, entertainment and management of our health. The shift towards society is already so great that some scholars have called it an e-society (Safieddine & Baltezarević, 2016). E-company communities will grow around virtual networks dominated by technological advances. The Internet revolution has fairly changed society (Fuchs, 2007). What started as a computer network, enabling users to receive information online, turned into something considerably larger in a relatively short time. The Internet is currently a business location where most businesses sell and buy (Chaffey, 2007). Social media have become the huge thing that allows individuals to share, network and communicate online. Businesses want to network and engage with their customers, to send messages, share information, interact to collect information or to simply transfer files via the Internet at the same time (Osita-Ejikeme, 2018). Organizations have grown their reliance on IT. IT has a significant impact on the functioning of an organization. IT-enabled organizational framework which enables new types of employment to be developed and fosters contacts between supervisors and subordinates. If companies have superior IT skills, they want to make quicker decisions to meet changing consumer demands (Osita-Ejikeme, 2021).

Over the years, the development of successful SMEs in Nigeria has been hindered by the tough financial conditions that characterize the business environment in Nigeria. Among these problems are the informal sources of money, insufficient entrepreneurial skills, weak infrastructural and institutional support, persistent political conflicts, ethno-religious conflicts,

as well as bad governance, etc. as highlighted by Etuk, Etuk and Bakhebo (2014). Small businesses in Nigeria are the most popular type of business whose contribution to economic growth is crucial (Kale, 2019). As of 2018, for example, SMEs accounted for 96% of all enterprises in Nigeria, 84% of employees and 48% of GDP (Akpata, 2018). The impact on SMEs of the Covid-19 epidemic cannot, however, be disregarded. Segal and Gerstel, (2020) forecast in their study that, from March 2020 onwards, economic growth will decline without a definite ending date and certain nations may face a recession. Seth, Gannie and Zafar (2020) felt that the impact of COVID-19 on small and medium-sized enterprises is likely to be serious. However, the channels and the extent to which they are not obvious. Oyewale, Adebayo and Kehinde (2020) revealed that, through partial and total lockdown and mobility restrictions, most entrepreneurs (somewhat and severely) have been affected by the COVID-19 epidemic. Even if COVID-19 finally disappears, the impact will remain longer than predicted for businesses. Existing research states that entrepreneurial orientation has often been viewed as one strategy for company success in a crisis circumstance such as the Ebola virus, SARS, and other contagious illnesses which sometimes threatened the world. Entrepreneurial orientation not only gives a corporation competitive advantages but also a type of sustainable growth (Devece, Peris-Ortiz & Rueda-Armengot, 2016; Zeebaree & Siron, 2017; Desbureaux et al., 2020).

In Nigeria various scientists have carried out entrepreneurial orientation studies in SMEs (Bolarinwa & Okolocha 2016; Otache & Mahmood 2016; Olubiyi, Egwakhe, Amos & Ajayi 2019) with a particular focus on the impact of EO on profitability and performance. However, this study takes a different route by analyzing the impact of technological advancements on entrepreneurial orientation in Rivers State SMEs.

Research Objective

The objective of this work is to examine the impact of Technological Advancements on Entrepreneurial Orientation in SMEs in Rivers State, Nigeria.

Specifically, the study

- i. Examines the influence of Technological Knowledge on Proactiveness.
- ii. Assesses the impact of Technological Knowledge on Competitive Aggressiveness.
- iii. Checks the impact of Technological Volition on Proactiveness.
- iv. Assesses the influence of Technological Volition on Competitive Aggressiveness.

2. Literature Review

Theoretical Framework

Knowledge Based View (KBV)

The KBV views the company as an institution that develops, amasses and uses knowledge to create value (Eisenhardt & Santos, 2002). It argues that knowledge is a fundamental resource and that heterogeneity of the knowledge base among companies leads to changes in performance (Felin & Hesterly, 2007). In particular, companies utilize several entrepreneurial methods to enhance and sustain the differentiation of their knowledge base (Galunic and Eisenhardt 1994), e.g. by producing knowledge-based resources internally through their own R&D or externally through acquisition of knowledge. The KBV of the company is an organizational learning management concept that offers companies options to achieve a competitive edge. Continuous knowledge acquisition and transfer within corporate organisations, such as changing competitive situations in international markets, regular

deregulation and technical developments is needed. The KBV of the company considers knowledge as the most significant strategic resource and this view is and extends the company's RBV (De Carolis, 2002). Knowledge capacity is the most strategically vital for creating and sustaining competitive advantage (DeNisi et al., 2003). The leading creator of sustainable competitive advantage in high-performance companies is identified (Hiltrop, 1999). The ability to learn more quickly than competitors may be the sole lasting competitive advantage (Geus, 1988).

Technological Advancement

The practical application of scientific knowledge and concepts is technology. It is not a tangible entity, yet technology can be represented in physical form (patents, procedures, design documents, manuals, etc.). It is knowledge of the way in which scientifically determined materials, devices, products or processes are embodied. Technological advancement is an attempt to increase or understand the science behind the advancement of present materials, equipment, products or processes (Endro, 2014). Technological advancement is a modification of the method a product or service is produced or supplied which reduces input requirements for resources for production or delivery (IGI-Global, 2021). Technological advancement promotes the realization that scientific information and concepts are applied in practice. It helps to comprehend how facts and principles that are scientifically proven can be incorporated into the material, gadget, product or process.

We live in a rapidly changing world, and whichever business you work in is quite competitive. This means that companies today must be efficient, innovative and highly productive in order to succeed. All this may be done easily by investing in the greatest technology. One may streamline one's business activities, boost efficiency and productivity, and so obtain a competitive edge on the market through the use of technological advances. Technology has altered the way firms do business by enabling small businesses to compete with giant corporations on an equal footing. Small companies use a variety of technology, from servers to mobile devices, to create competitive economic benefits. This work takes on two of the four elements of technology (object, knowledge, activity and volition) as defined by Mitcham (1994). Wisdom and will are the two dimensions used.

Technological Knowledge

Technological knowledge describes the knowledge and ability of the company to employ different technologies, technological instruments and associated resources (Kurt, 2019). Technological knowledge is defined as the knowledge necessary for the implementation of different activities using technological equipment. Technological knowledge is a significant driver of both the decision to diversify and the company's performance, which depend on diversification (Klepper & Simons, 2000; Franco, Sarkar, Agarwal, and Echambadi, 2009). Teece (1988) defines the competence of a company as a set of differentiated technological competencies, complementary assets and organisation. This concept has made technological knowledge an integral part of research into RBV new product market entry, innovation and corporate growth (Chang, Eggers & Keum, 2014). The accumulated research shows a very strong association between technological experience and technological performance (Breschi et al. 2003), the probability of introducing new goods on current markets (Katila & Ahuja 2002), and even market entry modalities (Helfat & Lieberman, 2002). For example, the study by Breschi, Lisbonneoni and Malerba (2003), indicated that companies often relocate to technological spaces (measured using patent data) close to the technological spaces in which they currently operate, thereby contributing to a process of path-dependent growth.

Experience or commitment in one technology might also prevent a technology from entering a market that requires similar but competitive technology, especially if it calls for an organizational disruption or a displacement of existing technologies (Eggers, 2012).

Within the framework of Mitcham (1994), we may see a wide definition of technology and the human impulse to create and enhance technology that leads to the knowledge, manufacture and use of (new) technological items. This large-scale expression of technology as a time-independent benefit includes old to current technology, simple to advanced technology and the concept is not confined to any one kind of technology.

SMEs do not frequently exploit new technological knowledge in order to promote information transmission due to the lack of networks (Tański & Fernandez, 2015). SMEs use technology machinery and equipment that is essentially imported (Jardon, Cobas & Ortiz, 2020). R&D in these companies is essentially non-existent and is confined to the public sector with inadequate resources. Innovation is frequently the product of random, nonlinear and discontinuous imitation processes (Jardón & Tański, 2018). Technological knowledge enables new information technologies to be introduced. Witschel et al. (2019) noted that technological methods modified the organization and strategy of the company by making it possible to establish and implement the strategy to remain competitive. Technological knowledge helps customers to be managed as a significant tool for economic efficiency, customer loyalty and competition differentiation (Bhat & Kumar, 2004).

Technological Volition

Technological volition is the will to develop physical knowledge and utilize in products, processes and systems. Volition is described as the process of taking decisions and acting on them or 'force of will' (Corno 1993). In terms of technology, technological solutions are designed in diverse societal situations. There are numerous opportunities or barriers to be overcome in society (Thorshag & Holmqvist, 2019). The technological will refers to the willingness and goal of the company to design products, processes and systems (Mitcham, 2001). Volition refers to the social aspect of things or artifacts that are used by people (Nia and De Vries, 2016). How people deal with problems depends on how they act and decide on their will. This technological will influences the form of culture through its expressions and at the same time extends itself (Mitcham, 2001).

Entrepreneurial Orientation

Entrepreneurial-oriented (EO) SMEs can make unsafe and risky investment and reach markets before competitors with big profits, which play a key role in bringing companies in alignment with market demands and performance. As an entrepreneurial decision-making propensity, Okeyo, Semrau, Ambos and Kraus (2016) described entrepreneurial orientation as support for and enhance business and performance activities. Entrepreneurial orientation argues that certain activities which may be termed entrepreneurial emerge within companies, affecting organizational decisions, characteristics, processes, actions and achievements (Lumpkin & Dess, 1996). Enterprise guidance is the ability of a company to innovate, take risks and explore market possibilities proactively (Wiklund and Shepherd 2005). Jinpei (2009) claimed that entrepreneurial orientation is a person's behavior towards entrepreneurial activity, whether within an existing company or the creation of a new company. The phrase orientation guidance was used to describe the entrepreneurial making processes and styles of companies engaging in entrepreneurial activity (Lumpkin & Dess 2001). It covers the entrepreneurial aspects of the decisions, processes and practices of a company (Wiklund and Shepherd 2005).

Lumpkin and Dess's earlier theoretical work in 1996 advocated the independence of numerous aspects of EO – innovativeness, autonomy, risk-taking, proactiveness and competitive aggressiveness. Autonomy, briefly, is described as an independent action by a person or team to produce and implement a company strategy or goal. Innovation means a readiness for creativity and experimentation in the introduction of new products/services, and innovation, technological leadership and R&D in the development of new processes. Risk taking indicates a tendency to take audacious measures such as to enter unknown new markets, engage a significant number of resources into ventures with unsafe results and/or borrow heavily. Proactiveness is a prospective prospect for the introduction of new products or services in advance of competition and in anticipation of future demand for changing and shaping the environment. The intensity of a company's efforts to overcome industrial rivals displays competitive aggressiveness, which are defined by a combative attitude and a powerful response to the acts of the competition.

Proactiveness

Proactiveness is a capability to predict the actual occurrence of events and to take action on future difficulties (Arbaugh, Cox & Camp, 2009). Ambad and Wahab (2013) regard proactiveness as a prospect of the introduction of new products or services in advance of competition, which aims to provide opportunities and modify the environment in anticipation of a future demand. The qualities of a proactive company include aggressiveness and unusual techniques towards competing companies in the same market category, which actively search for and exploit their surroundings. Mwaura et al. (2015) claimed that proactive companies are introducing new products, technologies and administrative technology to influence and not react to their environment. Proactiveness specifies the qualities of entrepreneurial activities to predict and seek future product, technology, markets and demand prospects (Fayolle and Basso, 2009). The features of a proactive company include aggressiveness and innovative approaches towards competing companies in the same market category, which actively seek and utilize possibilities to alter their environments. Proactivity as an EO characteristic means the proactiveness and awareness to embrace new chances (Olawoye, 2016).

Competitive Aggressiveness

In contrast, competitive aggressiveness refers to the intensity of a company's efforts to outperform industry competitors. It is characterized by a strong offensive attitude towards conquering competitors and may also be extremely reactive when a company maintains its market position or aggressively joins a market identified by a rival. Competitive aggressiveness is the predisposition of a company to challenge its competitors directly and intensely to achieve entry or improve the situation of rival companies in the industry (Deepa Babu & Manalel, 2016). Competitive aggressiveness is described as the ability of SMEs to prevail and be the head of competition to seize every opportunity (Ogunsiji & Kayode, 2010). Le Roux and Bengesi (2014) stressed that, given the rapidly changing and intense competitive environment of SMEs worldwide, competitive aggressiveness is needed to maintain a competitive market position, given the exposure to a wide variety of products and services that change consumers' tastes and preferences. From the above, competitive aggressiveness can be considered a driving force to resist harsh competition and to respond adequately to existing and emerging competitive menaces.

Competitive aggressiveness refers to the efforts of a company to exceed its competitors. The company has the propensity to actively and intensively battle its competition to acquire entrance or enhance position: it is defined by reactivity to industry rivals on the market in

terms of confrontation or reactive action (Deakins & Freel, 2012). Competitive aggression as an entrepreneurial characteristic refers to the type of intensity and orientation for new entrants to compete often with existing competition. Competitive aggressiveness, as opposed to pro-activity, pertains to market opportunities, to the way companies “relate competitors” and “react to already existing market trends and demands” in relation to competitors (Messersmith & Wales, 2013).

Hypotheses

Ho₁: There is no significant relationship between Technological Knowledge and Proactiveness.

Ho₂: There is no significant relationship between Technological Knowledge and Competitive Aggressiveness.

Ho₃: There is no significant relationship between Technological Volition and Proactiveness.

Ho₄: There is no significant relationship between Technological Volition and *Competitive Advantage*.

3. Empirical Review

The role of entrepreneurial orientation to small business performance in different business sectors and locations has been explored by Kosa, Mohammad and Ajibie (2018). The primary data were acquired from a sample of 210 small businesses picked from the central area of Ethiopia using two multi-stage level sampling procedures. The findings from the study show that entrepreneurial orientation has a good effect on the performance of companies but will determine more when companies are founded in urban regions and participate in the industrial sector. Oyewale, Adebayo and Kehinde (2020) evaluated the effect of COVID 19 on Nigeria's SMEs connected cases and lock-down procedures. This study evaluated data using a linear probability model to assess the effect of the pandemic on business people by using the electronic data collection approach and models the elements influencing coping strategies with a multivariate probity model. We discovered that most of the entrepreneurs were significantly and somewhat affected by COVID-19 pandemics, due to partial and entire restrictions of lockout and movement. They observed that the effect of the COVID-19 pandemic vary by the economic sector (agriculture versus non-agriculture). For example, partial lock-down measures have had increased likelihood effects on poor sales among companies, especially in the non-agricultural field, but the situation in the food and agricultural industry is different. Moreover, partial lockout enhances the probability of changing business practices (coping strategies), but entire lockdown has a detrimental effect on coping strategies.

Kim, Park and Joh (2019) studied the influential performance variables by suggesting the results of technological development as a result of technological development technology, the performance and technological technology of organizations by means of past academic research. In addition, it examined the performance differences of technology company groups by separating groups into high-technology firms, medium-technology and low-technology companies. Based on this investigation, employees in technological development and technological development specialized research institutes have a favorable influence on product competitiveness of technological development performance among the indicators that constitute technological development capacity. In addition, expenses in technological development and technological skills were verified to have a positive technology on the

competitiveness of technological development performance. The bigger the number of people in research and development, the higher the sales by technological development; the higher the technology of technological skills, the higher the amounts of exports by technological development. In addition, technology business groups exhibited performance discrepancies.

Iqbal, Martins, Mata, Naz, Akhtar and Abreu (2021) examined the impact of business orientation, entrepreneurial leadership and organizational engagement on the performance of innovations. Data from 1095 staff working at various levels in SMEs were obtained for the study. The study used the modeling of a partially smaller structural equation to examine the hypotheses built. The results showed highly positive direct links between entrepreneurship, entrepreneurial commitment and innovation performance. The association between entrepreneurial orientation and innovation performance has also been positively mediated by the organizational commitment. This study also identified considerable moderating of transformative leadership between entrepreneurship orientation and corporate commitment. SMEs leaders should practice entrepreneurial guidance (innovation, proactiveness, risk-taking) and transformation leadership (with a compelling orientation, a focus on the achievement of goals and on creative problem resolution) to boost their companies' performance in innovation. In addition, this study provides a robust framework for SME leaders to design strategies to increase companies' readiness to bring innovation and to offer new products and services. Policymakers should improve employees' emotional attachment to their firms, a sense of moral duty to remain with the company that, in turn, will increase their corporate commitment to innovation.

Siegel and Renko (2012) explored the importance of Market and Technological Knowledge in spotting entrepreneurial opportunities by integrating Schumpeter's Chance theory into Kirzner's Chance theory of discovery. The data consist of a longitudinal sample of 42 new U.S., Finnish and Swedish biotechnology companies. The article notes that both market knowledge and technological knowledge (measured as patent numbers) help organizations to recognize entrepreneurial opportunities subsequently. The results demonstrate the value and importance of early market knowledge and technological knowledge for eventual recognition of opportunities.

Chang, Eggers and Keum (2014) propose a nuanced knowledge-based theory which indicates that technological knowledge proximity might or may not lead to entry, and that market knowledge can either complement or lead the entry independently to technological knowledge. They can find that technological closeness effectively disrupts entrance using a cross-industry data set with detailed product entry data, validating the premise that companies know more than they do. Market knowledge leads to the expected entrance behavior (proximity leads to increased entry) but is not a complement to technological knowledge. They also demonstrate that market knowledge is more important for bigger companies, whereas technological knowledge is more important for smaller enterprises.

Jardon, Cobas and Ortiz (2020) investigated the relation between technological knowledge and corporate culture in small livelihood companies (SSBs). It employs data from 980 surveys in the canton of La Maná (Cotopaxí, Ecuador) in a proportionate sample to assess the conditions of culture for the various components of the technological knowledge of SSBs. This study indicates that technological knowledge represents a source of immediate and long-term performance that confirms earlier work in intellectual capital for SSBs. The study also evaluates the moderating impact of culture and verifies that the connection between technological knowledge and short-term performance does not depend on culture. It demonstrates that culture is not a performance source. However, when the investigation

examines whether the effect of technological knowledge increases long-term performance, the findings indicate that culture limits that effect significantly, suggesting that cultural opportunists possibly do not pay any attention to the development of knowledge resources in SSBs.

4. Method

The population of this study constituted SMEs in Rivers State, Nigeria. The cross-sectional design was adopted for this study in sampling the opinions of workers in selected SMEs in Rivers state, Nigeria. A convenience sampling method was applied to gather data from respondents. A sample size of 300 entrepreneurs and their staff were randomly selected in Rivers State. Data were collected through copies of a structured questionnaire. All obtained questionnaire data were analysed using statistical techniques. The mean and standard deviation of the responses to each item on the questionnaire were calculated. Kendall's Tau_b Correlation analysis was used to test the relationship between Technological Advancements and Entrepreneurial Orientation. Analyses were done using Statistical Package for Social Sciences (SPSS) Version 25.0. The items for Technological Advancements were adapted from Hosseini and Kamal (2012) and Keller, Ucar and Kumtepe (2020), while items for Entrepreneurial Orientation were adapted from Lumpkin and Dess (2001). All items were measured on a 4-point Likert scale ranging from 1 – 4, where 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree.

5. Data Presentation

The mean and standard deviation of the various items listed in the questionnaire were computed and interpreted from the data and used in answering the research questions. The decision rule of the mean was 3.0, hence, accept item mean ≥ 2.5 , and reject item mean < 2.5 . The hypotheses were tested using correlation and Pearson correlation to test the relationship between Technological Advancements and Entrepreneurial Orientation. All the 300 administered copies of the questionnaire were retrieved and used in the study.

Table 1: Analysis of Respondents Responses to the Questionnaire Items

S/N	N = 300						Std. Dev.	Decision (Mean \geq 2.5)
	Items	SD	D	A	SA	Mean		
Technological Knowledge (Reliability = 0.847 Cronbach alpha value)								
1.	My firm keeps up with important new technologies.	31	72	72	125	2.97	1.036	Accepted
2.	I can learn the technologies easily.	41	44	116	99	2.91	1.009	Accepted
3.	I have the technical skills I need to use the technologies.	34	86	72	108	2.85	1.039	Accepted
4.	I have had sufficient opportunities to work with different technologies.	41	65	70	124	2.92	1.084	Accepted
5.	I can use the technology to develop strategies for solving problems.	41	103	55	101	2.72	1.073	Accepted

Technological Volition (Reliability = 0.832 Cronbach alpha value)								
6.	I am prepared to work hard to achieve goals with the available technology.	45	28	98	129	3.04	1.061	Accepted
7.	I am able to use the available technology to carry out tasks.	25	45	126	104	3.03	.912	Accepted
8.	I am confident that I can use the technology at my disposal.	22	78	113	87	2.88	.912	Accepted
9.	I think of different technology that can be used in my firm.	23	25	147	105	3.11	.854	Accepted
10.	I don't allow pressures to affect my ability to use the technology.	56	10	113	121	3.00	1.090	Accepted
Proactiveness (Reliability = 0.756 Cronbach alpha value)								
11.	My firm typically initiates actions which competitors then respond to	86	13	51	150	2.88	1.297	Accepted
12.	My firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.	75	10	33	182	3.07	1.281	Accepted
13.	My firm has a strong tendency to be ahead of other competitors in introducing novel ideas or products	83	18	80	119	2.78	1.233	Accepted
14.	My firm always keeps an eye out for new business ideas when looking for information	32	65	72	131	3.01	1.041	Accepted
15.	My firm can identify and capture business opportunities.	38	55	60	147	3.05	1.087	Accepted
Competitive Aggressiveness (Reliability = 0.883 Cronbach alpha value)								
16.	My firm is very aggressive and intensely competitive	86	18	55	141	2.84	1.287	Accepted
17.	In dealing with its competitors, my firm typically adopts a very competitive "undo-the-competitors" posture	47	59	38	156	3.01	1.161	Accepted
18.	Successful business people pursue any opportunity and do whatever they have to do in order to survive	23	100	56	121	2.92	1.020	Accepted
19.	My firm easily takes chances compared to others.	32	98	48	122	2.87	1.071	Accepted
20.	An opportunity to beat a competitor in a business deal is always a thrill	16	99	38	147	3.05	1.017	Accepted

Table 2: Hypothesis Testing

		Correlations				
		Technological Knowledge	Technological Volition	Proactiveness	Competitive Aggressiveness	
Kendall's tau_b	Technological Knowledge	Correlation Coefficient	1.000	.468**	.420**	.643**
		Sig. (2-tailed)	.	.000	.000	.000
		N	300	300	300	300
	Technological Volition	Correlation Coefficient	.468**	1.000	.665**	.455**
		Sig. (2-tailed)	.000	.	.000	.000
		N	300	300	300	300
	Proactiveness	Correlation Coefficient	.420**	.665**	1.000	.406**
		Sig. (2-tailed)	.000	.000	.	.000
		N	300	300	300	300
	Competitive Aggressiveness	Correlation Coefficient	.643**	.455**	.406**	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	300	300	300	300

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

All correlation coefficient and statistical significance are highlighted in bold font.

Source: SPSS Version 25.0 Output, 2021

The Correlations table presents Kendall's tau_b correlation between the dimensions of Technological Advancements and the measures of Entrepreneurial Orientation.

Table 3: Summary of Findings

Hypotheses	Coefficient of Correlation (T_b)	Coefficient of Determination (r^2)	Level of Relationship	Decision On H_0
H ₀₁	0.420	0.176	Medium	Rejected
H ₀₂	0.643	0.413	Medium	Rejected
H ₀₃	0.665	0.442	High	Rejected
H ₀₄	0.455	0.207	Medium	Rejected

Source: Data Output, 2021

Ho₁: There is no significant relationship between Technological Knowledge and Proactiveness.

The result of the analysis in Table 2 shows a significant level $p < 0.05$ ($0.000 < 0.05$), this means that there is a significant interconnection between technological knowledge and proactiveness. A correlation value of $T_b = 0.420$ shows that there is a positive relationship between technological knowledge and proactiveness. Furthermore, the coefficient of determination between Technological Knowledge and Proactiveness was 0.176. By implication, a unit change in Technological Knowledge will account for 17.6% total variation in proactiveness among the entrepreneurs. This entails that as one variable increases the other variable will increase, that is, when the entrepreneurs are knowledgeable in the technological advancements around, they will be proactive in making decisions. The study therefore observes that there is a positive and significant association between technological knowledge and proactiveness. In light of this, the study therefore rejects the null hypothesis and accept the alternate hypothesis that that *there is a significant interrelationship between technological knowledge and proactiveness*. This supports the view of Siegel and Renko (2012), who was of the opinion that technological knowledge leads to eventual recognition of opportunities.

Ho₂: There is no significant relationship between Technological Knowledge and Competitive Aggressiveness.

The output of the analysis in table 2, shows that there is relationship between technological knowledge and competitive aggressiveness the Kendall's tau-b correlation coefficient, T_b is 0.643, and that this is statistically significant ($p = 0.000$). Similarly, the coefficient of determination (r^2) was 0.413. By implication, a unit change in technological knowledge will result in 41.3% variation in competitive aggressiveness. This implies that an increase in technological knowledge will lead to a corresponding increase in competitive aggressiveness. Hence, the null hypothesis is rejected and the alternate accepted and it is concluded that *there is a significant relationship between technological knowledge and competitive aggressiveness*. This affirms the works of Kim, Park and Joh (2019) that technological development and technological skills have a positive technology on the competitiveness. Chang, Eggers and Keum (2014) further noted that technological knowledge is more important for smaller enterprises.

Ho₃: There is no significant relationship between Technological Volition and Proactiveness.

The result of the analysis in Table 2 shows a significant level $p < 0.05$ ($0.000 < 0.05$), this means that there is a significant interconnection between technological volition and proactiveness. A correlation value of $T_b = 0.665$ shows that there is a positive relationship between technological volition and proactiveness. Furthermore, the coefficient of determination between technological volition and proactiveness was 0.442. By implication, a unit change in technological volition will account for 44.2% total variation in proactiveness among the entrepreneurs. This entails that as one variable increases the other variable will increase, that is, when the entrepreneurs are willing to develop physical knowledge and utilize them in products, processes and systems, they will be proactive in making decisions. The study therefore observes that there is a positive and significant association between technological volition and proactiveness. In light of this, the study therefore rejects the null hypothesis and accept the alternate hypothesis that that *there is a significant interrelationship between technological volition and proactiveness*. The technological will helps firms to

design products, processes and systems (Mitcham, 2001) and hence, introduce new products/services, administrative techniques, operating technologies, etc.

Ho₄: There is no significant relationship between Technological Volition and Competitive Aggressiveness.

The analysis in table 2, shows that there is relationship between Technological Volition and Competitive Aggressiveness the Kendall's tau-b correlation coefficient, T_b is 0.455, and that this is statistically significant ($p = 0.000$). Similarly, the coefficient of determination (r^2) was 0.207. By implication, a unit change in technological volition will result in 20.7% variation in competitive aggressiveness. This implies that an increase in technological volition will lead to a corresponding increase in competitive aggressiveness. Hence, the null hypothesis is rejected and the alternate accepted and it is concluded that *there is a significant relationship between technological volition and competitive aggressiveness*. Le Roux and Bengesi (2014) stressed that, given the rapidly changing and intense competitive environment of SMEs worldwide, competitive aggressiveness is needed to maintain a competitive market position, given the exposure to a wide variety of products and services that change consumers' tastes and preferences, this can be achieved through volition.

6. Conclusion

This study accessed the correlation between Technological Advancement and Entrepreneurial Orientation. It specifically examined the interrelationship between technological knowledge and proactiveness; technological knowledge and competitive aggressiveness; technological volition and proactiveness; and, technological volition and competitive aggressiveness. There were significant relationships between the dimensions and the measures. This implies increase in the dimensions will lead to a corresponding increase in the measures. Proactiveness had stronger relationship with technological volition ($T_b=.665$), than with technological knowledge ($T_b=.420$); while competitive aggressiveness correlated better with technological knowledge ($T_b=.643$) than with technological volition ($T_b=.455$). Entrepreneurs should enhance their entrepreneurial orientation practices by introducing new lines, technology and markets; promote new ideas and design; and compete with aggression by acting proactively. This work contributes to existing knowledge as regards to the inclusion of technological advancement in evaluating entrepreneurial orientation. Further research can be carried out on the other dimensions of technological advancement (activity and object) and the other measures of entrepreneurial orientation (autonomy, risk-taking and innovativeness). The tool utilized in this study can pose a limitation. Works can be carried out using other statistical tools, which include but not limited to, AMOS, Smart PLS, etc.

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