

# The Effect of Technology Entrepreneurial Capabilities on Technopreneurial Intention of Nascent Graduates

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## Abstract

Owing to the turbulence of entrepreneurial environment in recent years, the need to examine how technology entrepreneurship capabilities affect nascent graduate mindset toward creating new technology-based organizations is topical. Despite the fact that technological capabilities, relational capabilities, financial capabilities, and knowledge-sharing capabilities are central drivers of technology entrepreneurship, explicit gaps exist in the literature concerning their impact on technopreneurship intention. Thus, the aim of this paper is to examine the relationship between technology entrepreneurial capabilities and technopreneurship intention. A cross-sectional study was conducted with seven hypotheses in order to investigate the mediating role of knowledge sharing capabilities on the relationships between technology entrepreneurship capabilities (technological, relational, and financing) and technopreneurship intention. The hypotheses are tested based on data collected from 121 nascent graduates in Nigeria using multiple regression. Based on the output of the results, the study suggests direct and full mediating role of knowledge-sharing capabilities on technology entrepreneurship capabilities and technopreneurship intention. Thus, knowledge-sharing capabilities mediates the relation between technological capabilities and technopreneurship intention, as well as financial capabilities and technopreneurship intention. However, its mediation effects on relational capabilities and technopreneurship intention was not found. The findings indicate that technology entrepreneurship capabilities (technological, relational, and financial capabilities) influence technopreneurship intention through knowledge-sharing capabilities. From the theoretical perspective, the study extends the dynamic capabilities theory into technology entrepreneurship research. This study has manifold implication to policy makers and nascent graduate seeking career in technology-based firms.

**Keywords:** Knowledge-sharing capabilities, technological capabilities, relational capabilities, financial capabilities, technopreneurship intention, nascent graduate.

Research paper

## Introduction

Scholars across the globe know that research trend is moving toward inter-disciplinary research, where entities that were investigated in silo are now studied in integration. Nelson & Winter (1982) point that “the creation of any sort of novelty in art, science, or practical life – consists to a substantial extent of a recombination of conceptual and physical materials that were previously in existence”. Accordingly, Gruber, Harhoff, & Karin (2013) suggest that the combination of scientific knowledge with other disciplines is good for technological progress. As a result, individuals with different academic background are being encouraged to collaborate and work together. One of these fusion is technology entrepreneurship or technopreneurship where knowledge and capabilities of management and scientific/engineering professions is blended in business operation (Singhry, 2012).

Several studies exist on entrepreneurial intention. For instance, studies have examined cognitive approach to entrepreneurial intention model (Liñán & Chen, 2009); education and psychological factors on entrepreneurial intention (Marques, Ferreira, Gomes, & Rodrigues, 2012), innovation capability (Börjesson, Elmquist, & Hooge, 2014), entrepreneurial capabilities (Karra, Phillips, & Tracey, 2008), graduate entrepreneurship intent (Khayri, Yaghoubi, & Yazdanpanah, 2011; Nabi & Lin, 2011) and undergraduate entrepreneurial intent (Davey, Plewa, & Miemie, 2011). Despite the growing studies on entrepreneurship intention, empirical relationship between graduate technopreneurship capabilities and entrepreneurial intention remain unclear and scarce in academic literature. As such, the extent to which the blend between graduate technopreneurship capabilities and technology entrepreneurial intention needs further clarity, especially in an uncharted research setting and environment.

Graduate entrepreneurship will continue to remain an emergent and topical area of research in Nigeria. Every year Nigerian institutions of higher learning produces large number of graduates who cannot be holistically employed in both the public and organized private sectors (Adawo, 2013). Each year, approximately 1.8 students graduates from higher learning institutions in Nigeria. Statistics have revealed that more than 80% of these graduates remain unemployed (Chinyere & Faith, 2012). Furthermore, statistics from NBS (2014) shows that of the total level of employment across economic activities in Nigeria, only 11.9 graduate are employed. As a result, the need for a study to examine graduate technopreneurial knowledge and skills can to a large extent encourage technopreneurial behaviour.

Even though, literature on technology entrepreneurship is increasing, they were largely based on qualitative and descriptive studies (Petti & Zhang, 2013). As such, the need for empirical studies to strengthen theory building of technology entrepreneurship is topical and requisite. Moreover, many studies on graduate entrepreneurship have been conducted in developed countries with only a few in developing economies (Hattab, 2014; Koe, Rizal, Abdul, & Ismail, 2012). Therefore, the aim of this paper is to examine whether knowledge sharing capabilities mediates the relationship between technology entrepreneurship capabilities and technopreneurship intentions.

### Literature Review

Institutions of higher education in Nigeria are producing large number of graduates who mostly rely on public sector employment. However, the government realizing the benefit of self-employment and empowerment is creating better programmes and environment for technology entrepreneurship. One of these programme is the SURE-P which among several objectives target self-employment among nascent graduates. Studies have shown that self-employment have multiplier effect on the economy (Grace & Ihuoma, 2013). In this study, nascent graduate entrepreneur is a young graduate in science, engineering, or management disciplines who obtained a bachelor degree or Higher National Diploma (HND) in the past 5 years and intend to pursue a career in private sector as technopreneurs.

Technology entrepreneurship is concerned with transformation of theoretically feasible technological ideas and knowledge into prosperous ventures. While evidence of statistical decline in the performance of technology-intensive compared with non-technology intensive industry have been reported, Vaaler & McNamara (2010) did not find any difference on the mortality rates between these industries. Despite the significant relationship between technological innovation and firm performance, success depends largely on the capabilities of the entrepreneurs (Tremblay, Daou, & Brie, 2014; Duening, Hisrich, & Lechter 2011). In Nigeria, it is compulsory for undergraduates to take courses in entrepreneurship and information technology. This clearly shows that Nigerian nascent graduates have theoretical romance with technology entrepreneurship. Thus, the need to nurture their theoretical knowledge into intention is critical for technopreneurial development. Davey et al., (2011) found that there is greater dispositions for entrepreneurial intentions of Africa students if compared with their counterparts in Europe and Asia. Table 1 provides the definition of variables used in this study.

**Table 1: Definitions of variables**

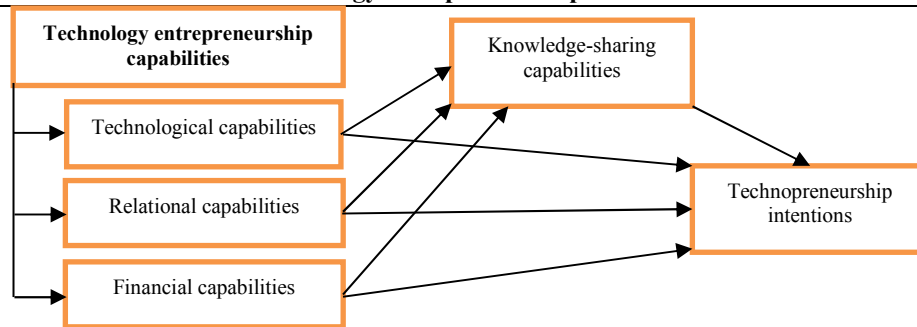
<b>Variables</b>	<b>Definition</b>
Technology entrepreneurship	“The blend of specialized persons with mixed assets and skills in engineering and management/marketing who create high potential technology-based firm” (Singhry, 2012).
Technological capability	“Set of skills use in building and leveraging different technologies and systems” (Ho, Fang, & Lin, 2011).
Relational capability	“Organizational abilities, personal networks, special favors and opaque transactions within and between firms, groups of individuals and institutions” (Yan, Zhang, & Zeng, 2010).
Financial capabilities	“The capabilities of managing money’, ‘planning ahead’, ‘making choices’ and ‘getting financial help’ (Atkinson, Mckay, Kempson, & Collard, 2007; 2006)
Knowledge sharing capability	“An ability to openly discuss data and information with partners with the aim of reinforcing learning, gaining experience, and seizing new opportunities” (Lin, Wu, & Lu, 2012).
Entrepreneurial intention	“State of mind and behaviour directing and guiding the actions of individuals towards the development and implementation of new business concepts” (Hattab, 2014).
Graduate entrepreneurship	“Interaction between the graduate as the product of university education and business start-up in terms of an individual’s career-orientation and mindset towards self-employment” (Davey et al., 2011)..
Nascent entrepreneurs	The Global Entrepreneurship Monitor (GEM) define nascent entrepreneurs as “individuals who are active in the process of starting a new firm during the preceding 12 months and with expectations of full or part ownership, but have not yet launched one” (Pathak, Xavier-oliveira, & Laplume, 2013)

### Theoretical and research framework

This study is underpinned in the dynamic capabilities theory (Teece, 2003). The theory postulates that organization operates within the limits of its resources and capabilities (Teece, 2007). It also examines how entities build, integrate, configure, and reconfigure their internal and external processes and competencies to

achieve competitive advantage (Teece, 2003; Kim, Cavusgil, & Cavusgil, 2013). The study argues that competence are acquired through education and therefore support the idea that entrepreneurs can be made. Thus, individuals with better technopreneurship capabilities will exhibit high disposition to start a new firm in the future. Previous studies have shown that entrepreneurial education is positively related with students' intention to be self-employed (Hattab, 2014; Mitra, Abubakar, and Sagagi, 2011). Based on the dynamic capabilities theory and the work of Duening, et al, (2011) who identified capital intensity, knowledge intensity, accelerated pace of change and the network effect as drivers of technology entrepreneurship. In line with Duening, et al., the research framework in figure 1 is developed:

**Figure1: Research framework of technology entrepreneurship and intention**



### Hypothesis Development

#### **Technological capabilities, knowledge-sharing capabilities, and graduate technology entrepreneurial intention**

Technological capabilities are crucial to firm performance, survival, future innovation and competitive advantage. Technological capabilities emanate from the structural part of the dynamic capabilities theory and comprises the valuable and non-imitable technical knowledge that influences technological innovation (Lamin & Dunlap, 2011). Individuals with strong technological capabilities may be able to generate more value from technology investment and achieve higher level of collaborative gains (Garcia, Avella, & Farnandez, 2012). However, entity without IT expertise may be unaware of new technologies or may not want to risk the adoption of latest technologies.

Even though several studies have suggested significant relationship between technological capabilities and firm performance, José & Ortega (2010) and Liu, Ke, Kee, & Hua (2013) found an interaction relationship of technological capabilities on competitive strategies and performance. Furthermore, information technology (IT) infrastructure have significant relationship with knowledge-sharing capabilities (Cheng & Chen, 2014). While education and skill level have significant relationship with the adoption and use of technology, IT capabilities was positively related with technology entrepreneurship intentions (Millman, Li, Matlay, & Millman, 2010). Thus, the higher a technological capabilities, the easier to implement and integrate technology and acquire knowledge partners, and the greater is the tendency to use the knowledge for corporate gains (Wu, 2014).

While entrepreneurship is broadly linked with wealth creation, employment, poverty reduction and economic growth (Singhry, 2012), technological innovation based on knowledge integration is one of the central drivers of entrepreneurial performance (Pathak et al., 2013). Although, most previous studies link technological capabilities with knowledge sharing and firm performance, it can be argued that individuals learn more by investing in new technologies than from old ones. Secondly, since technology entrepreneurship is determined by competence in technological know-how, the researcher suspects that technology entrepreneurship intention shall be predetermined by technological capabilities. Based on these arguments and in line with the dynamic capabilities theory, the following hypotheses are postulated:

H1: There is a relationship between technological capabilities and technopreneurship intention.

H2: Knowledge-sharing capabilities mediates the relationship between technological capabilities and technopreneurial intention.

#### **Relational Capabilities, knowledge sharing capabilities, and graduate technopreneurship intention**

In today's hypercompetitive market, the individual effort of a firm owner is not enough to win and achieve better quality, decrease costs, and flexibility. To obtain these advantages, firm owners have to search for collaborative opportunities among efficient and responsive partners (Inemek & Matthyssens, 2013). A firm's relational capabilities encompass enthusiastic and systematized interchange of ideas and experiences among partners. Relational capabilities are means to increase firm performance through shared activities with other firms.

Terminology such as collaboration capabilities, network ties, relational capabilities, organizational ties, personal relationships, trust, cooperative behavior and interpersonal ties are often used to described relational

capabilities (Yan et al., 2010). Benefits of relational capabilities include improved competence to develop long-term relationship, resources sharing, synergy, and increased information sharing. Relational capabilities is driven by joint trust, honesty, joint risk and joint rewards (Cao & Zhang, 2011). New collaboration is usually translated into new knowledge and opportunities. Previous studies suggest positive relationship between collaboration and firm performance (Fawcett, Magnan, & McCarter, 2008; Soosay, Hyland, & Ferrer, 2008).

Relational capabilities must be combined with other capabilities to increase the effectiveness and efficiency of technology investment (Voudouris, Lioukas, Iatrelli, & Caloghirou, 2012; Yam, Lo, Tang, & Lau, 2011). Several studies have found significant relationship between relational capabilities and knowledge-sharing capabilities. Example, the influence of relational capabilities on knowledge-based capabilities are fundamental elements of competitive advantage (Cheng & Chen, 2014). Relational capability has a positive influence on new knowledge acquisition and use, as well as technological innovation performance (Xu, Liu, Zhou, & Su, 2012). The success of collaborative innovation capabilities depend on knowledge sharing capabilities of partners in a relationship (Barbaroux, 2012).

Despite the significant relationship between relational capabilities and knowledge sharing behaviour/firm performance, the relationship between relational capabilities and technopreneurship intention is unclear in the academic literature. This paper suspects that the relational capabilities influence technopreneurship intention; and knowledge-sharing capabilities mediate this relationship. Based on these arguments and in line with the dynamic capabilities theory, it is postulated that:

H3: There is a relationship between relational capabilities and technopreneurship intention.

H4: Knowledge-sharing capabilities mediates the relationship between relational capabilities and technopreneurial intention

#### **Financing capabilities and graduate technopreneurship intention**

Financial capability is a new concept which “encompasses people’s knowledge and skills to understand their own financial circumstances, along with the motivation to take action” (Donnell & Keeney, 2010). Individuals with financing capabilities are able to use financial information to plan ahead, and know how to collaborate and seek advice from financing sources. Although technological innovation is strongly link to firm performance and economic development, technological entrepreneurship cannot be successful with limited capital (Abbasian & Yazdanfar, 2013). Another stream of research argues that although individuals from rich families are exposed to entrepreneurial traits and environment, those from mid-level income have higher entrepreneurial instincts to become technology entrepreneurs (Millman et al., 2010).

Despite the above financial arguments, the need to identify sources of venture financing is critical for success of new technology-based enterprises (Koekemoer & Kachieng, 2002). While most financing options emphasizes funding from banks and other specialized financing agencies, studies from nascent entrepreneurs’ perspective is under-researched. This is owing to the fact that they have less banking experiences and limited assets to offer as collateral in developing countries. Even though, nascent graduate entrepreneurs do not have financial resources for start-up, their level of education is an advantage to develop strategies to access and assess formal financing options and sources.

Previous studies have demonstrated positive relationship between financial capabilities and innovation capabilities/performance. However, studies linking financial capabilities with technopreneurship intention is unknown in the literature. Since financial capability is one of the major drivers of technology entrepreneurship, the researcher suspects that financial capabilities will influence both knowledge-sharing capabilities and technopreneurship intention. Base on the argument above and in line with dynamic capabilities theory, the following hypothesis are postulated:

H5: There is a relationship between financial capabilities and technopreneurship intention.

H6: Knowledge-sharing capabilities mediates the relationship between financial capabilities and technopreneurial intention

#### **Knowledge sharing capabilities and technopreneurship intention**

Research on knowledge management capabilities come to light with the emergence of theories such as resource-based view, dynamic capabilities and knowledge-based view. As the technological and market environments become global and dynamic, acquiring, combining, and sharing knowledge become more critical to innovation process and competitive advantages. Knowledge becomes more valued if shared, organized, and applied in distinctive ways (Zahra, Neubaum, & Larrañeta, 2007). Several research have investigated the concept of knowledge sharing processes and innovation performance from different perspective (Zheng, Zhang, Wu, & Du, 2011; Wang & Wang, 2012).

Xu, Liu, Zhou, & Su (2012) found that new knowledge acquisition is significantly correlated with application of new knowledge. Knowledge-sharing behaviour affects innovative behaviour and the propensity to share and promote new ideas (Mura, Lettieri, Radaelli, & Spiller, 2013a; Camelo et al., 2011; Fuentes-fuentes,

2013). Knowledge-based capabilities enable continual renewal of knowledge base for innovation activities and long-term performance (Zheng et al., 2011). Esen & Esen (2013) found that knowledge management capability mediates the relationship HRM and innovation. Petti & Zhang (2013) found that knowledge exploitation and exploration leads to group cohesion, greater technology management and performance.

Knowledge-sharing capabilities is a major component of both dynamic capabilities theory and technology entrepreneurship. Individuals that acquire new know-how about new venture creation are more likely to develop intention toward starting a new firm. Despite the numerous and increasing studies about knowledge sharing capabilities, the literature is unclear on its relationship with technology entrepreneurship intention. Thus, the researcher suspects that knowledge-sharing capabilities affect technopreneurship intention. Based on these arguments and combining the dynamic capabilities theory, it is postulated that:

H7: There is a relationship between knowledge-sharing capabilities and technopreneurship intention.

### **Method and sample**

The study is psychometric where perception of graduate students in Nigeria was investigated. A total of 250 questionnaire were personally distributed through face-to-face contact. A total of 163 (65.2%) questionnaires were collected. However, only 121 (48.4%) were found usable. The sample was drawn from individuals that have graduated from Nigerian universities and polytechnic within the last five years during a graduate entrepreneurial workshop in 2014 at Bauchi State of Nigeria. The graduate were randomly targeted and those who qualified to participate in this study were asked to fill a questionnaire. Liñán & Chen (2009) show that university graduates have higher predisposition toward starting a new firm. All scales used in this study have already been developed and validated. However, while some of the scales were adapted, the wordings of others were modified to suit the context of this study. All the variables were measured on 7-point Likert-type measurement scales depicted by 1 = strongly disagree to 7=strongly agree.

### **Measurement of variables**

The measure for technopreneurial intention was adopted and modified from Liñán & Chen (2009), which was also used by Iakovleva, Kolvereid, Stephan, Iakovleva, & Kolvereid, (2011) and Chen (2011). Technological capability was measured based on the scale validated by Real, Leal, & Rolda (2006), which was also used by Martín-rojas, García-morales, & Bolívar-ramos (2013). The scale consist of 27 items which has been trimmed to 6 items to reflect the context of this study. Knowledge sharing capability was measured based on the scale used by many scholars (e.g., Auh & Menguc, 2013; Fuentes-fuentes, 2013; Mura, Lettieri, Radaelli, & Spiller, 2013; Sauk, Kim, Lee, & Kim, 2013; Camelo, García, Sousa, and Valle, 2011; Seba, Rowley, & Lambert, 2012; Solesvik, Westhead, Kolvereid, Matlay, & Solesvik, 2012; Reyshav & Weisberg, 2010). Items from Relational capability was measured based on the scale developed and validated by Walter, Auer, & Ritter (2005). Lastly, measures of financial capabilities were obtained from Atkinson, McKay, Kempson, & Collard (2007; 2006) and Chen (2011).

### **Analysis**

The study was conducted in five stages. First was extensive literature review to determine the underlying constructs and dimensions of the study. Second was followed by development of measurement scales which were adopted and modified. Third, the factor loading, reliability, and test of normality were carried out to determine whether the model was fit for further analysis. Fourthly, hypothesis were tested using multiple regression based on SPSS 20. Lastly, the results are discussed, concluded and implications provided.



**TABLE 2: Descriptive statistics**

Variable		Frequency	Per cent
<b>Graduating Institution</b>	University	99	81.8
	Polytechnic	22	18.2
	Total	121	100.0
Academic background	Sciences	38	31.4
	Engineering	15	12.4
	Art	19	15.7
	Management	46	38.0
	Environmental	3	2.5
	Total	121	100.0
Gender	Male	85	70.2
	Female	36	29.8
	Total	121	100.0
Age	18-25 Years	22	19.0
	26-30 Years	44	36.4
	31-40 Years	45	37.2
	41-50 Years	9	7.4
	Total	121	100.0

**Table 2** shows that 99 (81.8%) of the respondents graduated from the university while 22 (18.2%) graduated from polytechnic. Technopreneurship courses are made compulsory in Nigerian institutions of higher learning. Therefore, any graduate in Nigeria must be taught entrepreneurship as a course. Further, all the institutions have entrepreneurship development centres which encourage and develop entrepreneurial capabilities of undergraduate, thus preparing them for the task of being self-reliant. The distribution of the respondents based on academic background shows that 38 (31.4%) studies science related courses, 15 (12.4%) studied engineering related courses, 19 (15.7%) studied art, 46 (38%) have background in management related disciplines, while 3 (2.5%) graduated from faculty of environment. 85 (70.2%) of the respondents are male while 36 (29.8%) are female. Age distribution shows that 22 (19%) of the respondents are 18-25 years, 44 (36.4) are between 26 and 30 years, 45 (37.2%) are 31-40 years, while 9 (7.4%) are aged 41-50 years.

**Factor analysis: assessing of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO - MSA), and Bartlett's Test of Sphericity**

The normality test was assessed using one sample Kolmogorov-Smirnov test as indicated in table 3. The test statistic shows that the data come from a normal distribution. In order to uncover the underlying dimensions of the construct 'technology entrepreneurship', the researcher performed exploratory factor analysis (EFA). Based on the results of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO - MSA), and Bartlett's Test of Sphericity in table 4, it was concluded that the output of EFA with KMO-MSA values ranging from .752 - .883 and Bartlett's Test of Sphericity (chi-square 242.87 - 47118; sig. at .000) is fit for further analysis (Williams & Brown, 2012).

**Table 3: One-Sample Kolmogorov-Smirnov Test**

		Technological capabilities	Relational capabilities	Financial capabilities	Knowledge sharing capabilities	Technopreneurship intention
N		121	121	121	121	121
Normal Parameters <sup>a,b</sup>	Mean	31.6694	33.7355	34.0826	41.8843	38.4463
	Std. Deviation	7.12670	7.04127	6.91085	7.33620	8.01660
Most Extreme Differences	Absolute Positive	.140	.202	.126	.200	.172
	Positive	.080	.137	.084	.166	.094
	Negative	-.140	-.202	-.126	-.200	-.172
Kolmogorov-Smirnov Z		1.543	2.224	1.390	2.203	1.894
Asymp. Sig. (2-tailed)		.017	.000	.042	.000	.002

a. Test distribution is Normal.

b. Calculated from data.

**Assessing items Factor loading, reliability, mean, and standard deviation**

**Table 4: Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO - MSA), and Bartlett's Test of Sphericity (BTS), Factor Loading, Reliability Test, Mean, and Standard Deviation**

Items	KMO-MSA	Approx. Chi-Square	BTS	Factor Loading	CR	Cronbach's Alpha	Mean	Std. Dev.
<b>Technological capabilities</b>	.796	242.87	.000		.826		32.5405	6.48885
TEC1				.736		.800		
TEC2				.787		.783		
TEC3				.823		.776		
TEC4				.763		.791		
TEC5				.703		.804		
TEC6				.584		.830		
<b>Relational capabilities</b>	.852	423.07	.000		.888		34.1624	6.65396
REC1				.779		.873		
REC2				.898		.854		
REC3				.886		.855		
REC4				.850		.862		
REC5				.671		.892		
REC6				.758		.876		
<b>Financial capabilities</b>	.752	244.21	.000		.764		34.6381	6.87124
FCA1				.855		.739		
FCA2				.672		.804		
FCA3				.844		.731		
FCA4				.757		.749		
FCA5				.885		.689		
FCA6				.725		.714		
FCA7				.638		.701		
<b>Knowledge-sharing capabilities</b>	.883	423.48	.000		.884		42.4103	6.64630
KSC1				.839		.852		
KSC2				.537		.882		
KSC3				.713		.856		
KSC4				.777		.870		
KSC5				.779		.848		
KSC6				.862		.876		
KSC7				.764		.884		
<b>Technopreneurship intention</b>	.874	471.18	.000		.873		39.1875	7.63530
TEN1				.552		.891		
TEN2				.854		.839		
TEN3				.913		.830		
TEN4				.886		.835		
TEN5				.890		.835		
TEN6				.787		.852		

All items on technological capabilities, relational capabilities, knowledge sharing capabilities, and innovation capabilities loaded satisfactorily above .600 and were thus used respectively. Factor loaded items were then transform to remove outliers.

**Table 5: Correlation matrix**

Variables	Technological capabilities	Relational capabilities	Financial capabilities	Knowledge-sharing capabilities	Technopreneurship intention
Technological capabilities	1				
Relational capabilities	.608**	1			
Financial capabilities	.452**	.528**	1		
Knowledge-sharing capabilities	.597**	.798**	.565**	1	
Technopreneurship intention	.372**	.280**	.518**	.398**	1

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

Table 5 shows that all the variables are correlated with one another and significant at  $p < 0.01$ .

### Hypothesis testing

In order to test the mediation effect, the researcher followed the procedure outlined by Baron & Kenny (1986). The procedure involves four stages: According to Baron & Kenny (1986), mediation occur when it satisfies four conditions: “(a) the total effect of X on Y ( $t$ ) must be significant; (b) the effect of X on M ( $\alpha$ ) must be significant; (c) the effect of M on Y ( $\beta$ ) must be significant; (d) the direct effect of X on Y adjusted for M ( $t'$ ) must be smaller than the total effect of X on Y”. Full mediation occurs if the relationship between the independent and dependent variable turn into non-significant as a result of the effect of the mediator variable (Hurmelinna-laukkanen, 2011). Multiple regressions results of technology entrepreneurship capabilities, Knowledge-sharing capabilities, and technopreneurship intention is shown on table 6.

**Table 6: Multiple Regression Results**

Variable Relationship	R	R <sup>2</sup>	F	Beta	t-value	p-value
(Constant)	.567 <sup>a</sup>	.322	18.481		4.199	.000*
Predictors: (Constant), Technological capabilities				.231	2.366	.020**
Predictors: (Constant), Relational capabilities				-.105	-1.020	.310
Predictors: (Constant), financial capabilities				.488	5.340	.000*
Dependent Variable: Technopreneurship intention						
(Constant)	.823 <sup>a</sup>	.678	82.076		4.093	.000*
Predictors: (Constant), Technological capabilities				.141	2.095	.038**
Predictors: (Constant), Relational capabilities				.621	8.774	.000*
Predictors: (Constant), Financial capabilities				.174	2.764	.007*
Dependent Variable: ), Knowledge-sharing capabilities						
(Constant)	.419 <sup>a</sup>	.176	25.366		4.981	.000*
Predictors: (Constant), Knowledge sharing capabilities,				.419	5.036	.000*
Dependent Variable: Technopreneurship intention						

\*\*p-value is significant at the 0.05 (2-tailed)  
<sup>a</sup>p-value is significant at the 0.05 (2-tailed)

### Discussion of findings

Based on table 5, results of model 1 shows a significant relationship between technology entrepreneurship capabilities and technopreneurship intention ( $R^2 = .322$ ,  $f$ -value = 18.481,  $t$ -value = 4.199,  $p$ -value = 0.00). There is a significant relationship between technology entrepreneurship capabilities and knowledge-sharing capabilities ( $R^2 = .823$ ,  $f$ -value = 82.076,  $t$ -value = 4.093,  $p$ -value = 0.00). Further regression test also shows a significant relationship between knowledge-sharing capabilities and technopreneurship intention ( $R^2 = .419$ ,  $f$ -value = 25.366,  $t$ -value = 4.981,  $p$ -value = 0.00). Based on these results, it can be suggested that knowledge-sharing capabilities mediates the relationship technology entrepreneurship capabilities and technopreneurial intention.

Analysis of the individual variables in table 5 demonstrates the full mediation effect of knowledge-sharing capabilities between technological capabilities and technopreneurship intention. The mediation effect of



knowledge-sharing capabilities on technological capabilities and technopreneurship intention was revealed with a significant relationship between technological capabilities and technopreneurship intention (t-value = 2.366, p-value = .020); technological capabilities and knowledge-sharing intention (t-value = 2.095, p-value = .038); and knowledge-sharing capabilities and technopreneurship intention (t-value = 5.036, p-value = .000). Based on these results, it can has been demonstrated that knowledge-sharing capabilities fully mediates the relationship between technological capabilities and technopreneurship intention.

Furthermore, the mediation effect of knowledge-sharing capabilities on the relationship between relational capabilities and technopreneurship intention is not found with a non-significant relationship between relational capabilities and technopreneurship intention (t-value = -1.020, p-value = .310). However, the relationship between relational capabilities and knowledge-sharing capabilities is significant (t-value = 8.774, p-value = 0.00); as well as knowledge sharing capabilities and technopreneurship intention (t-value = 5.036, p-value = 0.00).

Lastly, the full mediation effect of knowledge-sharing capabilities on the relationship between financial capabilities and technopreneurship intention was determined (t-value = 5.340, p-value = 0.00); financial capabilities and knowledge-sharing capabilities (t-value = 2.764, p-value = .000); knowledge sharing capabilities and technopreneurship intention (t-value = 5.036, p-value = 0.00). Based on these results, it can has been demonstrated that knowledge-sharing capabilities fully mediates the relationship between financial capabilities and technopreneurship intention. An overall summary of the hypotheses tests and mediation effect of knowledge-sharing capabilities on the relationship between technology entrepreneurship capabilities and technopreneurship intention is provided in table 7. Developing capabilities to become an entrepreneur requires learning ability and acquisition of requisite knowledge. The findings of this study support Ali (2013) that entrepreneurial capabilities developed through education stimulate and propel entrepreneurship career.

**Table 6: Outcome of hypotheses test and the mediating effect of knowledge-sharing capabilities on the relationship between technology entrepreneurship capabilities and technopreneurship intention**

	<b>Constructs relationships</b>	<b>t-value</b>	<b>p-value</b>	<b>Mediation effect</b>
H1	Technological capabilities and technopreneurship intention	2.366	.020*	Mediation effect of knowledge-sharing capabilities on the relationship between technological capabilities and technopreneurship intention is supported.
H2	Technological capabilities and knowledge-sharing capabilities	2.095	.038*	
H3	Relational capabilities and technopreneurship intention	-1.020	.310	No mediation effect of knowledge-sharing capabilities on the relationship between relational capabilities and technopreneurship intention is supported.
H4	Relational capabilities and knowledge-sharing capabilities	8.774	.000*	
H5	Financial capabilities and technopreneurship intention	1.756	.000*	Mediation effect of knowledge-sharing capabilities on the relationship between financial capabilities and technopreneurship intention is supported.
H6	Financial capabilities and knowledge-sharing capabilities	8.646	.000*	
H7	Knowledge-sharing capabilities and technopreneurship intention	5.036	.000	
<b>Overall hypothesis test</b>				
	Technology entrepreneurship capabilities and technopreneurship intention	4.199	.000	Mediation effect of knowledge-sharing capabilities on the relationship between technology entrepreneurship capabilities and technopreneurship intention is supported.
	Technology entrepreneurship capabilities and knowledge-sharing capabilities	4.093	.000	
	Knowledge-sharing capabilities and technopreneurship intention	5.036	.000	

## Conclusion

The major aim of this study was to empirically examine the relationship between technology entrepreneurship capabilities and technopreneurship intention. This study presented a research model of technology entrepreneurship and technopreneurship intention. The study found that technology entrepreneurship capabilities (technological, relational, and financial) significantly determine technopreneurship intention. It is also found that knowledge knowledge-sharing capabilities is a full mediator between technology entrepreneurship capabilities and technopreneurship intention. The relationship between knowledge-sharing capabilities and technopreneurship intention is consistent with Mura, Lettieri, Radaelli, & Spiller (2013) who suggest a significant relationship between knowledge sharing behaviors and innovative behaviour. Zheng et al. (2011) also demonstrate that knowledge-based dynamic capabilities mediates the relationship between networked capabilities and innovation performance

The finding on the relationship between technological capabilities and technopreneurship intention concur with Ho, Fang, & Lin (2011) that new/old knowledge sharing capability is a major component of technological capabilities and technological capabilities facilitate technological innovation and number of new patents Furthermore, technological capability is associated with new knowledge acquisition and technology development (Zahra et al., 2007). Individuals with strong technological capabilities generate more value from technology investment and achieve higher level of collaborative gains (Garcia et al., 2012). Consistently, information technology (IT) infrastructure have significant relationship with knowledge-sharing capabilities (Cheng & Chen, 2014).

The findings on relationship between relational capabilities and knowledge-sharing is consistent with Cheng & Chen (2014) who suggest that relational governance and dynamic capabilities improve value-based relationships and innovation performance. Furthermore, the findings support Xu, Liu, Zhou, & Su (2012) who found that relational competence leads to new knowledge acquisition and application. Furthermore, Zheng, Zhang, Wu, & Du (2011) showed that knowledge-based dynamic capabilities mediates the relationship between networked capabilities and innovation performance. Lastly, the findings on the relationship between financial capabilities and graduate technopreneurship intention is in line with the work of Millman, Li, Matlay, & Millman (2010) who found that individual level of incomes is directly related to entrepreneurial intentions.

## Theoretical and Policy implications

This study is novel and serves as primary stage in the stream of empirical research on technology entrepreneurship and nascent graduate technopreneurship intention. Despite the fact that technological capabilities, relational capabilities, financial capabilities, and knowledge-sharing capabilities are central drivers of technology entrepreneurship, explicit gaps exist in the literature concerning their theoretical impact on technopreneurship intention. This paper tried to fill the flaws by extending the dynamic capabilities theory into technology entrepreneurship research. Research of this nature is a major step in an under-research but thought-provoking discipline of technology entrepreneurship and is capable of creating awareness as well as attract the attention of future researchers toward theory building and testing.

This study provides manifold insights to policy makers and graduate seeking to develop graduate technology entrepreneurship behaviors. Policy makers, entrepreneurial development agencies, and educational institutions can use the outcome of this study to shape and influence the thinking of Nigerian graduate toward early behaviors and creation of technology-based ventures. The study holds the key for encouraging nascent graduates to blend their technological, relational, financial capabilities with knowledge-sharing competences in order to start new technology-based firms.

## Future directions

Despite the outcome of this investigation, this study is not without limitations. The research framework of this study may serve as a starting point for future theoretical and empirical research in understanding technopreneurship capabilities and intention. Other dimensions can be added to strengthen the framework. First, technology entrepreneurial traits of nascent graduate can be an important element in understanding the successful intention of nascent graduate and should be included in future studies. Secondly, entrepreneurial orientation of nascent graduates should be investigated. Thirdly, future researchers shall employ other management and entrepreneurial theories to underpinned technology entrepreneurship studies. Lastly, the research framework can be tested in order countries and most especially from cross-country perspective.

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