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Impact of Entrepreneurial Orientation and Self-Efficacy on Students' Intentions to Pursue Technopreneurship

Justice N. Muchineripi[1*]
Olwin Kankuni[2]
Tendai Chimucheka[3]

AFFILIATIONS

[1,2&3]Faculty of Management and Commerce, University of Fort Hare, Alice, South Africa.

CORRESPONDENCE

Email: justice.muchineripi@gmail.com*

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Abstract: Technopreneurship has the potential to address unemployment and economic development challenges in South Africa. However, the level of technopreneurial activity among students considered to be technological natives remains low compared to the average in the developed world. This study investigates the influence of entrepreneurial orientation and self-efficacy on students' intention to pursue technopreneurship. Quantitative research was conducted using a correlational research design. A sample of 133 students was selected, and data were collected through online questionnaires using purposive sampling. SPSS version 24 was employed to analyse the data. The study revealed that entrepreneurial orientation, through its five dimensions—innovativeness, risk-taking, autonomy, competitive aggressiveness, and proactiveness—positively influences students' intention to pursue technopreneurship. It also demonstrated that self-efficacy positively impacts students' intentions. Both entrepreneurial orientation and self-efficacy significantly and positively influence students' intention to pursue technopreneurship. Universities should implement programmes aimed at enhancing entrepreneurial orientation and self-efficacy to promote technopreneurship among students. This study contributes to the body of knowledge in South Africa by determining the effects of entrepreneurial orientation and self-efficacy on students' intention to pursue technopreneurship. Additionally, it provides recommendations for policymakers on how to support students intending to pursue technopreneurship through intervention programmes, such as providing mentorship and funding. This research adds to the understanding of how different population groups are motivated to pursue entrepreneurship, with a specific focus on technopreneurship.

Keywords: Technopreneurship, entrepreneurial orientation, self-efficacy, students' intention.

1. Introduction

In the current environment, dominated by technological advancements, technopreneurship has become a key driver of economic growth and innovation (Machmud et al., 2022). The blending of entrepreneurship and technology has created opportunities for new business models, established new industries, and transformed how we interact, work, and live (Kahpi et al., 2024). As students represent a segment of the youth who are technology natives and are expected to drive entrepreneurial transformation, it is essential to understand the forces that motivate them to start technology-based business ventures. While various factors influence one's pursuit of entrepreneurship, the existing literature (Maheshwari, 2021; Stewart et al., 2023) shows that entrepreneurial orientation and self-efficacy are significant predictors of entrepreneurship and have attracted the attention of numerous researchers. Technopreneurship involves entrepreneurship, with technology playing a pivotal role in this era. It is the fusion of technological genius with entrepreneurial skills and qualities (Zavoianu & Scarlat, 2024). Technopreneurs introduce innovations for new goods and services, disrupting the current economy. While technopreneurship has always been inherent in business and economic development, it has become more prominent in

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our time.New technologies, once merely imagined, now play a remarkable and dominant role in enabling businesses to achieve extraordinary performance levels (Salhieh & Al-Abdallat, 2021).

Entrepreneurial orientation refers to an individual's propensity to engage in entrepreneurial activities such as risk-taking, problem-solving, proactiveness, and innovativeness (Hassan et al., 2021). Self-efficacy refers to individuals' confidence in their ability to succeed in entrepreneurial pursuits, including their belief in their knowledge, abilities, and skills (Elnadi & Gheith, 2021). Technopreneurship is essential to economic growth, particularly in developing nations, as it drives innovation and creates jobs and productivity (Rafiana, 2024). As the world enters the Fourth Industrial Revolution, technological advancements present opportunities to develop technology-based entrepreneurial ventures. In South Africa, tech startups have been on a growth trajectory, and innovative companies have emerged in areas such as education (edtech), healthcare (healthtech), and finance (fintech) (Bowmaker-Falconer & Herrington, 2020).

Over the years, South Africa has registered significant progress in technology adoption and penetration (Mateko, 2024). This reality presents opportunities for businesses supported by the internet and mobile technologies. Although South Africa has performed well in terms of access to technology, the country still needs to leverage it effectively for social and economic development. This indicates that there is room for improvement to ensure that the available technology leads to a significant socioeconomic impact. One possible way to increase the impact of technology is for those with access to utilise it to start business ventures. In South Africa, young people classified as Generation Z and Millennials constitute the largest group of technology users (Pollio & Cirolia, 2022). However, it is essential to understand how ventures influence each youth group in technology-based entrepreneurship. This study specifically focuses on the impact of entrepreneurial orientation and self-efficacy on students' intention to pursue technopreneurship. Students are an essential part of society and are expected to play a significant role in the development and transformation of their communities (Mei et al., 2020). Additionally, as youth unemployment remains high in South Africa, it is encouraged that some young people take the entrepreneurial route to create employment for themselves and others (Mahlaole & Malebana, 2021). This calls for an understanding of the factors that drive students toward technopreneurship.

Entrepreneurship is a broad concept that encompasses business creation in various sectors and fields. Therefore, it is essential to investigate the prevailing situation in each sector. This allows for context-specific insights into how population groups influence ventures in specific aspects of entrepreneurship, such as technopreneurship (Bui et al., 2020). Drawing on existing literature (Hassan et al., 2021; Shahzad et al., 2021), entrepreneurial orientation and self-efficacy are significant antecedents of entrepreneurial venture creation. Despite this reality, the literature on the impact of entrepreneurial orientation and self-efficacy on students' intention to pursue technopreneurship still needs to be explored, presenting an opportunity for a study to bridge the current knowledge gap. Understanding the impact of entrepreneurial orientation and self-efficacy on students' intention to pursue technopreneurship provides insights that can help formulate programmes and activities that cultivate self-efficacy and entrepreneurial orientation, thus preparing students for successful technopreneurial careers.

2. Literature Review and its Accompanying Hypotheses

Entrepreneurial orientation is an individual's propensity to engage in innovation, risk-taking, and proactive opportunity-seeking (Hassan et al., 2021). There are five dimensions of entrepreneurial orientation: risk-taking, proactivity, innovation, competitive aggression, and autonomy (Svotwa et al., 2022). Several studies have used these variables to measure entrepreneurial orientation (Martins et al., 2022). Martins and Perez (2020) state that entrepreneurial orientation can be enhanced by implementing various skills and traits, including risk management, proactivity, inventiveness, competitiveness, and independent thinking (da Cruz et al., 2021).

In addition to entrepreneurial orientation, self-efficacy also influences students' intentions to pursue technopreneurship. According to Lopez-Garrido (2020), self-efficacy is the belief in one's ability to perform actions necessary to attain a specific performance goal. One's ability to effectively execute the actions required to deal with such situations depends on their judgment. Cherry (2023) defines self-efficacy as the conviction that one can influence motivation, actions, and social surroundings. Self-efficacy is one of the most critical elements of motivational theory, as individuals are more likely to be motivated to complete a task confidently. Numerous factors, such as study motivation and professional choice, are influenced by self-efficacy (Kodden & Kodden, 2020).

It is hypothesised that self-efficacy beliefs differ based on functioning and activity environments. Four primary sources of influence—mastery experiences, vicarious experiences, social persuasion, and emotional states—are responsible for the development of self-efficacy (Lopez-Garrido, 2020). Lopez-Garrido (2020) states that self-efficacy can be the cornerstone for motivation, well-being, and individual success. Students' intentions to develop technology-based enterprises are likely to be enhanced when they report higher levels of self-efficacy. Students with high academic self-efficacy are particularly inclined to launch their own companies. This demonstrates how higher levels of self-efficacy among students could correspond to increased levels of technological intentions (Salhieh & Al-Abdallat, 2021).

The phrase "technopreneurial intention" is derived from "entrepreneurial intention." Technopreneurship involves the creation of businesses based on technology (Machmud et al., 2022). Technopreneurial intention can be described as the willingness to start and run a technology-based venture (Salhieh & Al-Abdallat, 2021). This concept is fundamental to entrepreneurship, as it underpins actual entrepreneurial activity (Salhieh & Al-Abdallat, 2021). A technopreneur is a technology enthusiast with an entrepreneurial mindset, characterised as a modern business owner who relies heavily on technology. The production of exceptional products depends significantly on information, creativity, and innovation (Koe et al., 2021). Technopreneurs distinguish themselves through their ability to gather and organise knowledge, as well as mobilise resources to achieve business or societal goals. Thus, the combination of technological and entrepreneurial skills is commonly referred to as technopreneurship.

Technopreneurial and entrepreneurial intentions are synonymous, referring to an individual's readiness to start and oversee a technology-based company. Technopreneurs are technology-oriented businesspeople who capitalise on technical business opportunities through funding, shared decision-making, and understanding (Bhutto, 2024). The best way to represent behaviour is through intention to act. Hence, entrepreneurial intention serves as an effective predictor of future behaviour. This indicates that an individual's goals can be utilised to forecast the likelihood of launching a firm (Al-Mamary et al., 2020). Koe et al. (2021) examined the degree of technopreneurial intention and variations in intention between male and female college students. Three hundred and sixty-one final-year students from a Malaysian public institution participated in the study by responding to an online survey. This research assessed the level of technopreneurial intention and the differences in intention between male and female university students, revealing that male students showed greater interest in technology than female students. Yordanova et al. (2020) reported that a study in Bulgaria investigated how academic institutions influenced a sample of STEM students' inclinations to pursue technology entrepreneurship. The findings indicated that higher education impacts students' aspirations to engage in technological entrepreneurship. The literature discussed provides a foundation for the subsequent literature review by paving the way for the study's hypotheses.

2.1 Self-efficacy and technopreneurial intention

The role of self-efficacy in entrepreneurship is significant. Available literature indicates positive associations between self-efficacy and entrepreneurial activities (Chien-Chi et al., 2020). Self-efficacy serves as a motivational force, instilling confidence in individuals to pursue entrepreneurial

endeavours (Elnadi & Gheith, 2021). However, the extent to which self-efficacy influences entrepreneurial intention varies based on the levels of self-efficacy reported by individuals (Al-Qadasi et al., 2023). Consequently, those who report higher levels of self-efficacy are more inclined to engage in technopreneurship (Kehinde, 2023). Self-efficacy is enhanced by four sources of information: mastery experience, verbal persuasion, vicarious feedback, and psychological feedback (Salhieh & Al-Abdallat, 2021). Mastery experience results from successfully working on related activities in the past. Positive or negative remarks made by others that affect a person's sense of self-efficacy are classified as verbal persuasion. Psychological feedback links self-efficacy to an individual's psychological reaction to a given task (Wu et al., 2022). Neneh (2022) asserts that individuals are more likely to complete tasks when their self-efficacy is high; conversely, they are more likely to postpone completing tasks when their self-efficacy is low.

This implies that students must possess high levels of self-efficacy to develop a strong willingness to engage in technopreneurship. Technopreneurs need to have strong self-reliance in their abilities and high self-efficacy to navigate any pushback from society when launching a new technology-based business (Salhieh & Al-Abdallat, 2021). Existing research has confirmed a significant correlation between self-efficacy and the intention to pursue entrepreneurship (Anwar et al., 2021). Based on this evidence, this study posits that self-efficacy increases the willingness to pursue technopreneurship among students. Relatedly, Hoque (2017) found that self-efficacy positively influenced the intention to launch technology-based business ventures among engineering students in Malaysia. These findings support the assertion made by Bandura's Social Learning Theory that the intention of engineering students in public institutions to launch their own companies may be influenced by their level of self-efficacy. In a previous study, Mei et al. (2020) recommended that public institutions prioritise strategies to enhance students' sense of self-efficacy in order to increase their desire to launch their businesses.

2.2 Entrepreneurial orientation and technopreneurial intentions

The nexus between entrepreneurial orientation and the intention to pursue entrepreneurship is significant for entrepreneurship research. With entrepreneurship evolving to encompass technological startups, there is a growing interest in understanding how entrepreneurial orientation influences the intention to start technology businesses (Donbesuur et al., 2020). The continued expansion and increase of digital technologies in South Africa have created many opportunities for technology-based startups, such as online stores, financial technology solutions, and online education (Martins et al., 2020). Entrepreneurial orientation, through its dimensions—including risk-taking, proactivity, innovation, competitive aggression, and autonomy—has been shown to exert a positive and significant influence on individual intention to pursue entrepreneurship in several studies (Martins et al., 2022).

2.3 Innovativeness and technopreneurship intentions

The link between innovativeness and the intention to undertake technology-based entrepreneurship is essential. Technology is associated with innovations; therefore, leveraging technology for entrepreneurial purposes requires innovative ideas (Svotwa et al., 2022). Innovativeness encompasses innate innovation, a personality trait believed to coexist with qualities such as tolerance, risk-taking, and conformity. This trait is also thought to be unlikely to remain consistent throughout a person's lifespan (Al-Mamary & Alshallaqi, 2022). Additionally, there is a high level of intrinsic inventiveness, characterised by risk-taking and a willingness to try new things, the ability to manage multiple ideas simultaneously, the capacity to present different viewpoints on persistent problems, and the capability to devise solutions (Salhieh & Al-Abdallat, 2021).

This suggests that innovative students may be inclined to establish technology-based business enterprises. Existing research has demonstrated a positive relationship between innovativeness and

the intention to pursue technopreneurship. Individuals with a high level of innovativeness are more likely to hold a strong intention to engage in entrepreneurship (Shahzad et al., 2021). This is because innovativeness fosters an entrepreneurial culture, encouraging employees to develop and implement new ideas. Moreover, innovativeness is a crucial driver of entrepreneurial behaviour, enabling individuals to recognise opportunities and develop creative solutions (Wathanakom et al., 2020). Entrepreneurial intention is also influenced by an individual's ability to think creatively and generate new ideas (Ferreira-Neto et al., 2023). Based on this, the following hypothesis is proposed.

2.4 Proactiveness and technopreneurial intentions

According to Hu et al. (2018), proactive behaviour is an individual's attempt to modify their surroundings. Proactiveness has been found to positively influence university students' entrepreneurial aspirations in the context of technopreneurial intentions. Proactive students can spot opportunities for advantage, act decisively, and ultimately influence their environment to bring about significant changes, as they tend to take the initiative to effect such changes (Al-Mamary & Alshallaqi, 2022).

Measuring proactiveness in technopreneurial intentions can be challenging, as it involves determining a person's propensity and capacity for taking the initiative to alter their surroundings (Aryaningtyas & Risyanti, 2023). Researchers have found that college students' proactive personalities significantly impact their entrepreneurial intent in educational research (Zeb et al., 2019). In a study involving Istanbul college students, it was discovered that proactiveness strongly predicted students' aspirations to pursue technopreneurial endeavours (Basar, 2017). Additionally, a study on Chinese college students by Li et al. (2020) found that proactivity enhanced technopreneurial intention and effectively converted it into entrepreneurial behaviour. This indicates that an increase in proactive behaviour will translate into an increase in entrepreneurial intention, as proactiveness enables individuals to identify opportunities and take the initiative, which is essential for intrapreneurial success.

2.5 Risk-taking and technopreneurial intentions

An individual’s willingness to take chances to seek entrepreneurial prospects is referred to as risk-taking. According to research, this love of risk positively impacts their intentions to pursue technopreneurial ventures (Salameh et al., 2022). This suggests that risk-taking students are more likely to participate in technopreneurial activities and pursue opportunities that others might pass up due to potential hazards. Furthermore, it has been discovered that students' entrepreneurial intentions are highly correlated with risk-taking (Al-Mamary & Alshallaqi, 2022). It follows that students who are risk-takers are more likely to be interested in becoming technopreneurs. Risk-taking can influence technopreneurial ambitions in several ways. First, an individual's aspirations to become an entrepreneur are positively impacted by their propensity to take risks, as entrepreneurship is associated with potential challenges such as a lack of a viable market or product failure. Accordingly, individuals who are willing to take risks are likely to explore entrepreneurial opportunities and engage in entrepreneurial activities (Corey, 2022). Thus, students are more likely to be interested in technopreneurship if they believe they possess specific personal entrepreneurial traits, such as risk-taking. Consequently, risk-taking students are more likely to acquire the abilities and mindset required to explore business prospects than their risk-averse counterparts.

2.6 Competitive aggressiveness and technopreneurial intentions

Competitive aggression refers to an individual's or organisation's willingness to take bold action and challenge competitors (Duong & Vu, 2024). Obtaining a competitive edge in the market entails acting assertively and proactively. It has long been established that taking risks is a necessary part of becoming an entrepreneur. Competitive aggressiveness is vital in promoting entrepreneurial intention, as it fosters an entrepreneurial culture that encourages individuals to challenge the status

quo and develop new ideas (van der Westhuizen & Goyayi, 2020). Furthermore, entrepreneurial intention is influenced by an individual's ability to think competitively and anticipate market trends. Competitive aggressiveness creates an environment that supports innovation, experimentation, and learning, which are essential for technopreneurial success.

Al-Mamary et al. (2020) identified competitive aggressiveness as one of the elements influencing students' attitudes towards behaviour and their intention to launch a new business. The study focused on factors influencing entrepreneurial ambitions among Saudi Arabian university students. Another study on technopreneurial intentions among STEM students in Bulgaria discovered a positive correlation between student entrepreneurial behaviour and intentions and entrepreneurship education, frequently emphasising the value of competitive aggressiveness among other traits (Yordanova et al., 2020). Qualities that impact individuals' intentions to engage in technopreneurship are closely associated with competitive aggressiveness (Al-Mamary & Alshallaqi, 2022).

2.7 Autonomy and technopreneurial intentions

In the context of technopreneurship, promoting autonomy among college students can have several advantages. For Yemeni university students, autonomy predicts entrepreneurial intention (Al-Mamary & Alshallaqi, 2022). This implies that encouraging students' autonomy can boost their desire to engage in technopreneurship. Environments that foster autonomy can enhance student motivation and engagement by satisfying their psychological need for autonomy. Students are more likely to be involved and invested in the process when they believe they have control over their learning and business endeavours. Such environments can also improve students' well-being, as they tend to feel a greater sense of meaning and purpose when they believe they have control over their learning and entrepreneurial activities, which can enhance their overall well-being (Hahn, 2020).

Tomy and Pardede (2020) state that individuals with high autonomy are more likely to have a firm intention to pursue technopreneurship. This is because autonomy enables individuals to take ownership of their ideas and projects, which is essential for technopreneurial success (Chien-Chi et al., 2020). Technopreneurial intention is thus influenced by an individual's ability to work independently and make decisions without external approval (Elnadi & Gheith, 2021).

Based on the literature discussion above, it is hypothesised that:

- H1: Self-efficacy (SE) has an effect on the technopreneurial intentions (TI) of students at the University of Fort Hare.
- H2: Innovativeness has an effect on the technopreneurial intentions of students at the University of Fort Hare.
- H3: Proactiveness (PROA) has an effect on the technopreneurial intentions (TI) of students at the University of Fort Hare.
- H4: Risk-taking has an effect on the technopreneurial intentions of students at the University of Fort Hare.
- H5: Competitive aggressiveness (COMA) has an effect on technopreneurial intentions (TI) of students at the University of Fort Hare.
- H6: Autonomy (AUTO) has an effect on the technopreneurial intentions (TI) of students at the University of Fort Hare.

3. Methods

The study utilised a positivist paradigm, which prioritised data collection and analysis techniques such as surveys, experiments, and statistical analysis, and it bases its arguments on empirical evidence (Park et al., 2020). In the positivist paradigm, real events can be empirically observed and explained logically. This paradigm was employed because the study aimed to statistically quantify how self-efficacy and entrepreneurial orientation affect the technopreneurial intentions of students at the University of Fort Hare in South Africa. A quantitative research approach was utilised to

establish the relationship between self-efficacy, entrepreneurial orientation, and students' intentions to pursue technopreneurship. This approach allowed the study to establish connections between variables and to produce unbiased and trustworthy data that can be extrapolated to larger populations.

A correlational design was used to investigate the relationship between entrepreneurial orientation and self-efficacy regarding students' intentions to pursue technopreneurship. The population consisted of students from the University of Fort Hare in South Africa, and the sample for the study comprised 133 participants. Purposive sampling, a non-probability sampling technique, was utilised as it allowed researchers to select a sample with the characteristics required for the study (Shamsudin et al., 2024). A questionnaire was administered as a data collection instrument, enabling the simultaneous collection of data from a large sample while providing respondents with a level of anonymity, which encourages honest and unbiased responses (Brace, 2018). The questionnaire was administered online via Blackboard, an online learning platform, and through email via the University of Fort Hare's daily bulletin.

The study aimed to ensure equal representation of participants; however, due to the use of non-probability sampling, the generalisability of the results is limited. SPSS version 24 was used to analyse the data for the study, with all tests conducted at the 5% level of significance. Bivariate data analysis, conducted through Spearman correlation analysis using SPSS, was employed to investigate specific relationships between variables. This approach was chosen due to the non-normal distribution of the data for the study variables. The correlation analysis aims to reveal the nature and strength of relationships between the variables under study (Tentama & Paputungan, 2019). Content validity was applied to ensure the validity of the data, and to maintain reliability, the Cronbach alpha coefficient was used to assess the instrument's reliability. The study was granted ethical clearance by the University of Fort Hare Institutional Faculty Research Ethics Committee (IFREC) to ensure that respondents' rights are upheld, promoting academic integrity and adherence to ethical standards.

4. Results and Discussion

4.1 Hypotheses testing-correlation analysis

Bivariate data analysis, conducted using Spearman correlation analysis in SPSS, was employed to investigate specific relationships between variables. This approach was chosen due to the non-normal distribution of the data for the study variables. The correlation analysis aims to reveal the nature and strength of the relationships between the variables under study. The relationships, as indicated by the results of the computed Spearman correlation analysis, are discussed below.

4.2 Self-efficacy and technopreneurial intentions

The hypothesis explored the relationship between self-efficacy (SE) and technopreneurial intentions (TI) among students at the University of Fort Hare. This investigation utilised Spearman's rank correlation coefficient analysis, and the hypothesis tested was as: *H1: Self-efficacy (SE) has an effect on the technopreneurial intentions (TI) of students at the University of Fort Hare.* The results from the analysis are displayed in Table 1.

Table 1: *Relationship between TI and SE*

			TI	SE
Spearman's rho	TI	Correlation Coefficient	1.000	.492**
		Sig. (2-tailed)	.	.000
		N	133	133
	SE	Correlation Coefficient	.492**	1.000
		Sig. (2-tailed)	.000	.
		N	133	133

According to the results presented in Table 1, a relatively strong and positive relationship of 0.492 was observed between self-efficacy (SE) and technopreneurial intentions (TI). This relationship is statistically significant, with a p-value of 0.000, which is less than 0.05. These findings enable researchers to conclude that self-efficacy (SE) significantly impacts students' technopreneurial intentions (TI) at the University of Fort Hare. A study by Kehinde (2023) produced similar results, acknowledging that individuals with higher levels of self-efficacy are more inclined to pursue technopreneurship. In practical terms, enhancements in self-efficacy (SE) correspond to improvements in students' technopreneurial intentions (TI) at the University of Fort Hare. These findings align with the study by Salhieh and Al-Abdallat (2021), which established that self-efficacy positively and significantly impacts technopreneurial intentions.

4.2 Innovativeness and technopreneurial intention

The initial hypothesis aimed to explore the connection between Innovativeness (INNO) and technopreneurial intention (TI) among students at the University of Fort Hare. A correlation analysis using Spearman's correlation coefficient was employed to examine and quantify the presumed relationship outlined in the hypothesis: *H2: Innovativeness has an effect on the technopreneurial intentions of students at the University of Fort Hare.* The results from the analysis are displayed in Table 2.

Table 2: *Relationship between innovativeness and technoprenuerial intention*

			TI	INNO
Spearman's rho	TI	Correlation Coefficient	1.000	.412**
		Sig. (2-tailed)	.	.000
		N	133	133
	INNO	Correlation Coefficient	.412**	1.000
		Sig. (2-tailed)	.000	.
		N	133	133

According to the results presented in Table 2, there appears to be a weak positive relationship between technopreneurial intentions (TI) and innovativeness (INNO) among students at the University of Fort Hare. This is evident from the coefficient value of 0.412. Furthermore, the relationship is considered statistically significant at a 5% significance level, given the probability value of 0.000, which is less than 0.05. These findings indicate that there is indeed a statistically significant relationship between innovativeness and technopreneurial intentions among students at the University of Fort Hare. This aligns with Wathanakom et al. (2020), who concluded that innovativeness can effectively predict technopreneurial intentions among university students. In contrast, a study by Hoque et al. (2017) found no significant relationship between innovativeness and technopreneurial intentions among university students. Essentially, as innovativeness is enhanced, the technopreneurial intentions of students at the University of Fort Hare are likely to improve.

4.3 Technopreneurial intentions and proactiveness

The second hypothesis aimed to ascertain the relationship between proactiveness and technopreneurial intentions among students at the University of Fort Hare. This examination involved using Spearman's correlation coefficient. The hypotheses tested are as follows: *H3: Proactiveness (PROA) influences technopreneurial intentions (TI) of students at the University of Fort Hare*. The results from the analysis are displayed in Table 3.

Table 3: *Relationship between proactiveness and technopreneurial intention*

			TI	PROA
Spearman's rho	TI	Correlation Coefficient	1.000	.423**
		Sig. (2-tailed)	.	.000
		N	133	133
	PROA	Correlation Coefficient	.423**	1.000

Sig. (2-tailed)	.000	.
N	133	133

Table 3 reveals a coefficient value of 0.423 and a p-value of 0.000. This indicates a relatively weak positive and statistically significant relationship between technopreneurial intentions and proactiveness. The significance is established as the p-value (0.000) is less than 0.05. The results support the acceptance of the alternative hypothesis, asserting that proactiveness (PROA) influences technopreneurial intentions (TI) among students at the University of Fort Hare. These findings are consistent with the research by Al-Mamary and Alshallaqi (2022), which confirmed that proactiveness positively impacts technopreneurial intentions. Furthermore, Zeb et al. (2019) indicated that students' proactive personalities substantially affect entrepreneurial intention, further supporting the results of this study. In practical terms, as proactiveness increases or decreases, corresponding changes in technopreneurial intentions (TI) among students at the University of Fort Hare can be expected.

4.4 Risk-taking and technopreneurial intentions

The third hypothesis aimed to investigate the association between risk-taking (RISK) and technopreneurial intentions (TI) among students at the University of Fort Hare. The analysis employed a bivariate correlation method, specifically Spearman's correlation coefficient. The hypotheses tested were as follows: *H4: Risk-taking influences the technopreneurial intentions of students at the University of Fort Hare.* The results from the analysis are displayed in Table 4.

Table 4: *Relationship between risk-taking and technopreneurial intention*

			TI	RISK
Spearman's rho	TI	Correlation Coefficient	1.000	.344**
		Sig. (2-tailed)	.	.000
		N	133	133
	RISK	Correlation Coefficient	.344**	1.000
		Sig. (2-tailed)	.000	.
		N	133	133

The results in Table 4 reveal a coefficient correlation value of 0.344, indicating a relatively weak positive relationship between the two variables. Furthermore, this relationship is statistically significant at the 5% level, with a probability value of 0.00, which is below 0.05. Based on these findings, the alternative hypotheses are accepted, concluding that risk-taking affects technopreneurial intentions among students at the University of Fort Hare. These findings contradict the study by Al-Mamary and Alshallaqi (2022), which indicated that risk tolerance is unlikely to remain constant throughout a person's lifespan. However, the results align with the findings of Koe et al. (2021), whose study revealed a positive relationship between risk-taking and technopreneurial intentions. In practical terms, risk-taking tendencies are associated with noticeable changes in the technopreneurial intentions of students at the University of Fort Hare.

4.5 Competitive aggressiveness and technopreneurial intentions

The fourth hypothesis aimed to determine the nature and strength of the relationship between competitive aggressiveness (COMA) and technopreneurial intentions (TI) among students at the University of Fort Hare. The analysis employed Spearman's correlation coefficient, and the following hypotheses were tested: *H5: Competitive aggressiveness (COMA) has an effect on the technopreneurial intentions (TI) of students at the University of Fort Hare.* The results from the analysis are displayed in Table 5.

Table 5: *Relationship between competitive aggressiveness and technopreneurial intentions*

			TI	COMA
Spearman's rho	TI	Correlation Coefficient	1.000	.204*
		Sig. (2-tailed)	.	.019
		N	133	133
	COMA	Correlation Coefficient	.204*	1.000
		Sig. (2-tailed)	.019	.
		N	133	133

According to the results presented in Table 5, a weak positive relationship exists between competitive aggressiveness (COMA) and technopreneurial intentions (TI), as indicated by the correlation coefficient value of 0.204. Importantly, this relationship is statistically significant at the 5% level, given the p-value of 0.019, which is less than 0.05. Based on these findings, we reject the null hypothesis and conclude that competitive aggressiveness (COMA) does indeed affect technopreneurial intentions (TI) among students at the University of Fort Hare. In practical terms, enhancements in competitive aggressiveness (COMA) are associated with improvements in students' technopreneurial intentions (TI) at the University of Fort Hare. These findings are supported by previous studies that emphasised how competitive aggressiveness fosters an entrepreneurial culture, encouraging individuals to challenge the status quo and develop new ideas (Al-Mamary & Alshallaqi, 2022; van der Westhuizen & Goyayi, 2020).

4.6 Autonomy and technopreneurial intentions

The fifth hypothesis aimed to investigate the relationship between autonomy (AUTO) and technopreneurial intentions among students at the University of Fort Hare. This investigation utilised Spearman's rank correlation coefficient analysis, and the hypothesis tested was as follows: *H6: Autonomy (AUTO) has an effect on the technopreneurial intentions (TI) of students at the University of Fort Hare.* The results from the analysis are displayed in Table 6.

Table 6: *Relationship between autonomy and technopreneurial intentions*

			TI	AUTO
Spearman's rho	TI	Correlation Coefficient	1.000	.456**
		Sig. (2-tailed)	.	.000
		N	133	133
	AUTO	Correlation Coefficient	.456**	1.000
		Sig. (2-tailed)	.000	.
		N	133	133

According to the results presented in Table 6, a relatively weak yet positive relationship of 0.456 was observed between autonomy (AUTO) and technopreneurial intentions (TI). This relationship is deemed statistically significant, as evidenced by the p-value of 0.000, which is less than 0.05. Based on these findings, it can be confidently asserted that autonomy (AUTO) has a discernible effect on students' technopreneurial intentions (TI) at the University of Fort Hare. In practical terms, improvements in autonomy (AUTO) are associated with enhancements in the technopreneurial intentions (TI) of students at the University of Fort Hare. These findings align with a study by Maheshwari et al. (2022), which established that autonomy was a significant predictor of entrepreneurial intention among students, indirectly influencing this intention through various factors such as attitude, subjective norms, and perceived desirability.

5. Conclusion

The study investigated the influence of entrepreneurial orientation and self-efficacy on students' intention to pursue technopreneurship. Based on the study's findings, entrepreneurial orientation

positively impacts technopreneurial intentions among university students. All five dimensions of entrepreneurial orientation—namely innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy—were reported to positively influence technopreneurial intentions among university students. This implies that enhancing entrepreneurial orientation through its five dimensions increases the likelihood of a university student pursuing technopreneurship. Accordingly, the study concludes that entrepreneurial orientation significantly predicts entrepreneurial intention among university students.

Furthermore, the study's results also showed that self-efficacy positively influences technopreneurship intentions among students. This means that one's belief in one's ability to perform actions necessary to attain a specific entrepreneurial goal enhances intentions to pursue technopreneurship. This implies that improvements in self-efficacy correspondingly result in an increased intention to pursue technopreneurship. Theoretically, the study demonstrated the applicability of the Theory of Planned Behaviour (TPB) in understanding how technopreneurial intentions are influenced by cognitive-related factors such as self-efficacy and entrepreneurial orientation. It adds a South African entrepreneurial dimension to studies on technopreneurship, which are concentrated mainly outside the Sub-Saharan region (Europe and Asia). Practical and policy implications can be drawn from the study's findings. The results inform practical solutions for promoting technopreneurial intentions among students by introducing an entrepreneurship curriculum that enhances entrepreneurial orientation and self-efficacy. From a policy perspective, the results inform decisions on developing policies that promote technopreneurship among university students.

5.1 Limitation & future research

The study findings reveal that entrepreneurial orientation and self-efficacy influence students' technopreneurship intentions. This calls for government, policymakers, and non-governmental organisations to devise intervention programmes aimed at supporting students who intend to venture into technopreneurship. Interventions may include compulsory entrepreneurship modules for all students, mentorship programmes, and funding opportunities. The study could also benefit from including various universities in each province in South Africa, which would allow for greater generalisability of the results. It followed a quantitative research approach, drawing conclusions solely based on numerical data. The study could be enhanced by adopting a qualitative lens to capture the lived experiences of students intending to pursue technopreneurship.

6. Declarations

Author Contributions: Conceptualisation (T.C & O.K); Literature review (J.N.M & O.K); methodology (J.N.M. & O.K.); software (N/A.); validation (J.N.M; T.C & O.K.); formal analysis (J.N.M; T.C. & O.K.); investigation (O.K.); data curation (J.N.M; T.C. & O.K.) drafting and preparation (J.N.M.); review and editing (J.N.M; T.C. & O.K.); supervision (N/A); project administration (N/A.); funding acquisition (N/A). All authors have read and approved the published version of the article.

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Data Availability: The data supporting the findings of this study are available from the corresponding author upon reasonable request. Access will be granted to researchers who meet the criteria for data sharing established by the institutional review board or ethics committee.

References

Al-Mamary, Y. H. S., Abdulrab, M., Alwaheeb, M. A., & Alshammari, N. G. M. (2020). Factors impacting entrepreneurial intentions among university students in Saudi Arabia: Testing an integrated model of TPB and EO. *Education Training*, *62*(7/8), 779–803. https://doi.org/10.1108/ET-04-2020-0096

Al-Mamary, Y. H., & Alshallaqi, M. (2022). Impact of autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness on students' intention to start a new venture. *Journal of Innovation & Knowledge*, *7*(4), 100239. https://doi.org/10.1016/j.jik.2022.100239

Al-Qadasi, N., Zhang, G., Al-Awlaqi, M. A., Alshebami, A. S., & Aamer, A. (2023). Factors influencing entrepreneurial intention of university students in Yemen: The mediating role of entrepreneurial self-efficacy. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1111934

Anwar, I., Jamal, M. T., Saleem, I., & Thoudam, P. (2021). Traits and entrepreneurial intention: Testing the mediating role of entrepreneurial attitude and self-efficacy. *Journal for International Business and Entrepreneurship Development*, *13*(1), 40–60. https://doi.org/10.1504/JIBED.2021.112276

Aryaningtyas, A. T., & Risyanti, Y. D. (2023). Increase entrepreneurial intentions: Proactive personality, entrepreneurship education, and academic support as predictors. *Journal of Business and Management Review*, *4*(7), 545–560. https://doi.org/10.47153/jbmr47.7422023

Basar, P. (2017). Proactivity as an antecedent of entrepreneurial intention. *Journal of Economic & Management Perspectives*, *11*(4), 285–295.

Bhutto, B. (2024). Technopreneurship education in graduate programs: Cultivating an entrepreneurial mindset through work-based learning. https://doi.org/10.13140/RG.2.2.11376.88327

Bowmaker-Falconer, A., & Herrington, M. (2020). Igniting start-ups for economic growth and social change. *Global Entrepreneurship Monitor South Africa (GEM SA) 2019/2020 Report.*

Brace, I. (2018). *Questionnaire design: How to plan, structure and write survey material for effective market research*. Kogan Page Publishers.

Bui, T. H. V., Nguyen, T. L. T., Tran, M. D., & Nguyen, T. A. T. (2020). Determinants influencing entrepreneurial intention among undergraduates in universities of Vietnam. *The Journal of Asian Finance, Economics and Business*, *7*(7), 369–378. https://doi.org/10.13106/jafeb.2020.vol7.no7.369

Cherry, K. (2023). Self-efficacy and why believing in yourself matters. *Verywell Mind*.https://www.verywellmind.com/what-is-self-efficacy-2795954#:~:text=Self%2DEfficacy%20Basics,succeed%20in%20a%20particular%20situation

Chien-Chi, C., Sun, B., Yang, H., Zheng, M., & Li, B. (2020). Emotional competence, entrepreneurial self-efficacy, and entrepreneurial intention: A study based on Chinese college students' social entrepreneurship project. *Frontiers in Psychology*, *11*, 547627. https://doi.org/10.3389/fpsyg.2020.547627

Corey, B. (2022). Risk in entrepreneurship: Everything you need to know. *HubSpot*. Retrieved 2 September 2024, from https://blog.hubspot.com/the-hustle/risk-in-entrepreneurship

da Cruz, M. D. F. P., Ferreira, J. J., & Kraus, S. (2021). Entrepreneurial orientation at higher education institutions: State-of-the-art and future directions. *The International Journal of Management Education*, *19*(2), 100502. https://doi.org/10.1016/j.ijme.2021.100502

Donbesuur, F., Boso, N., & Hultman, M. (2020). The effect of entrepreneurial orientation on new venture performance: Contingency roles of entrepreneurial actions. *Journal of Business Research*, *118*, 150–161. https://doi.org/10.1016/j.jbusres.2020.06.042

Duong, C. D., & Vu, N. X. (2024). Entrepreneurial education and intention: Fear of failure, self-efficacy, and gender. *Journal of Small Business and Enterprise Development*, *31*(4), 629–654. https://doi.org/10.1108/JSBED-02-2023-0057

Elnadi, M., & Gheith, M. H. (2021). Entrepreneurial ecosystem, entrepreneurial self-efficacy, and entrepreneurial intention in higher education: Evidence from Saudi Arabia. *The International Journal of Management Education*, *19*(1), 100458. https://doi.org/10.1016/j.ijme.2021.100458

Ferreira-Neto, M. N., de Carvalho Castro, J. L., de Sousa-Filho, J. M., & de Souza Lessa, B. (2023). The role of self-efficacy, entrepreneurial passion, and creativity in developing entrepreneurial intentions. *Frontiers in Psychology*, *14*, 1134618. https://doi.org/10.3389/fpsyg.2023.1134618

Hahn, D. (2020). The psychological well-being of student entrepreneurs: A social identity perspective. *International Entrepreneurship and Management Journal*, *16*(2), 467–499. https://doi.org/10.1007/s11365-019-00607-3

Hassan, A., Anwar, I., Saleem, I., Islam, K. B., & Hussain, S. A. (2021). Individual entrepreneurial orientation, entrepreneurship education and entrepreneurial intention: The mediating role of entrepreneurial motivations. *Industry and Higher Education, 35*(4), 403–418. https://doi.org/10.1177/09504222211007051

Hoque, A. S. M. M., Awang, Z., & Siddiqui, B. A. (2017). Technopreneurial intention among university students of business courses in Malaysia: A structural equation modelling. *International Journal of Entrepreneurship and Small & Medium Enterprise (IJESME), 4*(7), 1–16.

Hu, R., Wang, L., Zhang, W., & Bin, P. (2018). Creativity, proactive personality, and entrepreneurial intention: The role of entrepreneurial alertness. *Frontiers in Psychology, 9,* 951. https://doi.org/10.3389/fpsyg.2018.00951

Kahpi, H. S., Wulandari, S. S., Atichasari, A. S., & Marfu, A. (2024). Analysis of the relationship between innovative leadership and market orientation on the sustainability of technopreneurship: The mediating role of external regulatory compliance: An empirical evidence in Indonesia. *Environment, Development and Sustainability,* 1-42. https://doi.org/10.1007/s10668-024-05072-9

Kehinde, O. A. (2023). Influence of entrepreneurship self-efficacy and proactive personality on intention towards technopreneurship among undergraduate students. *Gender and Behaviour*, *21*(3), 22165–22176. https://hdl.handle.net/10520/ejc-genbeh_v21_n3_a26

Kodden, B., & Kodden, B. (2020). The impact of self-efficacy. In *The art of sustainable performance: A model for recruiting, selection, and professional development* (pp. 31–38). https://doi.org/10.1007/978-3-030-46463-9_5

Koe, W. L., Mahphoth, M. H., Alias, N. E., Krishnan, R., & Arham, A. F. (2021). Factors influencing intention towards technopreneurship among university students. *Journal of Educational and Social Research, 11*(1), 162-162. https://doi.org/10.36941/jesr-2021-0016

Li, C., Ashraf, S. F., Shahzad, F., Bashir, I., Murad, M., Syed, N., & Riaz, M. (2020). Influence of knowledge management practices on entrepreneurial and organisational performance: A mediated-moderation model. *Frontiers in Psychology, 11,* 577106. https://doi.org/10.3389/fpsyg.2020.577106

Lopez-Garrido, G. (2020). Self-efficacy theory. *Simply Psychology*. https://www.simplypsychology.org/self-efficacy.html

Machmud, R., Wuryaningrat, N. F., & Mutiarasari, D. (2022). Technopreneurship-based competitiveness and innovation at small business in Gorontalo City. *International Journal of Sustainable Development & Planning, 17*(4), 1-13. https://doi.org/10.18280/ijsdp.170408

Maheshwari, G. (2021). Factors influencing entrepreneurial intentions the most for university students in Vietnam: Educational support, personality traits or TPB components? *Education + Training, 63*(7/8), 1138–1153. https://doi.org/10.1108/ET-02-2021-0074

Mahlaole, S. T., & Malebana, M. J. (2021). The effects of entrepreneurship education on students' entrepreneurial intentions at a South African university of technology. *Journal of Entrepreneurship Education, 24,* 1-16.

Martins, I., & Perez, J. P. (2020). Testing mediating effects of individual entrepreneurial orientation on the relation between close environmental factors and entrepreneurial intention. *International*

Journal of Entrepreneurial Behaviour & Research, 26(4), 771–791. https://doi.org/10.1108/IJEBR-08-2019-0505

Martins, I., Perez, J. P., & Novoa, S. (2022). Developing orientation to achieve entrepreneurial intention: A pretest-post-test analysis of entrepreneurship education programs. *The International Journal of Management Education, 20*(2), 100593. https://doi.org/10.1016/j.ijme.2021.100593

Mateko, F. M. (2024). Opportunities in emerging technologies for Southern Africa: How the Global South should adopt to take advantage? *The Electronic Journal of Information Systems in Developing Countries*, e12321. https://doi.org/10.1002/isd2.12321

Mei, H., Lee, C. H., & Xiang, Y. (2020). Entrepreneurship education and students' entrepreneurial intention in higher education. *Education Sciences, 10*(9), 257. https://doi.org/10.3390/educsci10090257

Neneh, B. N. (2022). Entrepreneurial passion and entrepreneurial intention: The role of social support and entrepreneurial self-efficacy. *Studies in Higher Education, 47*(3), 587-603. https://doi.org/10.1080/03075079.2020.1770716

Nickerson, C. (2022). Interpretivism paradigm & research philosophy. *Simply* Sociology, *5*, 1-16.

Park, Y. S., Konge, L., & Artino Jr, A. R. (2020). The positivism paradigm of research. *Academic* Medicine, *95*(5), 690-694. https://doi.org/10.1097/ACM.0000000000003093

Pollio, A., & Cirolia, L. R. (2022). Fintech urbanism in the startup capital of Africa. *Journal of Cultural Economy, 15*(4), 508-523. https://doi.org/10.1080/17530350.2022.2058058

Rafiana, N. N. (2024). Technopreneurship strategy to grow entrepreneurship career options for students in higher education. *ADI Journal on Recent Innovation, 5*(2), 110-126. https://doi.org/10.34306/ajri.v5i2.995

Salameh, A. A., Akhtar, H., Gul, R., Omar, A. B., & Hanif, S. (2022). Personality traits and entrepreneurial intentions: Financial risk-taking as mediator. *Frontiers in Psychology, 13*, 927718. https://doi.org/10.3389/fpsyg.2022.927718

Salhieh, S. E. M., & Al-Abdallat, Y. (2021). Technopreneurial intentions: The effect of innate innovativeness and academic self-efficacy. *Sustainability, 14*(1), 238. https://doi.org/10.3390/su14010238

Shahzad, M. F., Khan, K. I., Saleem, S., & Rashid, T. (2021). What factors affect the entrepreneurial intention to start-ups? The role of entrepreneurial skills, propensity to take risks, and innovativeness in open business models. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(3), 173. https://doi.org/10.3390/joitmc7030173

Shamsudin, M. F., Hassim, A. A., & Abd Manaf, S. (2024). Mastering probability and non-probability methods for accurate research insights. *Journal of Postgraduate Current Business Research*, *9*(1), 38-53.

Stewart Jr, W. H., Peake, W. O., & Ingram, A. E. (2023). The interplay of core self-evaluation and entrepreneurial self-efficacy in predicting entrepreneurial orientation. *Journal of Small Business Management*, *61*(6), 2909–2937. https://doi.org/10.1080/00472778.2021.1951279

Svotwa, T. D., Jaiyeoba, O., Roberts-Lombard, M., & Makanyeza, C. (2022). Perceived access to finance, entrepreneurial self-efficacy, attitude toward entrepreneurship, entrepreneurial ability, and entrepreneurial intentions: A Botswana youth perspective. *Sage Open*, *12*(2). https://doi.org/10.1177/21582440221096437

Tentama, F., & Paputungan, T. H. (2019). Entrepreneurial intention of students reviewed from self-efficacy and family support in vocational high school. *International Journal of Evaluation and Research in Education*, *8*(3), 557–562. https://doi.org/10.11591/ijere.v8i3.20240

van der Westhuizen, T., & Goyayi, M. J. (2020). The influence of technology on entrepreneurial self-efficacy development for online business start-up in developing nations. *The International Journal of Entrepreneurship and Innovation*, *21*(3), 168-177. https://doi.org/10.1177/1465750319889224

Wathanakom, N., Khlaisang, J., & Songkram, N. (2020). The study of the causal relationship between innovativeness and entrepreneurial intention among undergraduate students. *Journal of Innovation and Entrepreneurship*, *9*(1), 15. https://doi.org/10.1186/s13731-020-00125-5

Wu, L., Jiang, S., Wang, X., Yu, L., Wang, Y., & Pan, H. (2022). Entrepreneurship education and entrepreneurial intentions of college students: The mediating role of entrepreneurial self-efficacy and the moderating role of entrepreneurial competition experience. *Frontiers in Psychology*, *12*, 727826. https://doi.org/10.3389/fpsyg.2021.727826

Yordanova, D., Filipe, J. A., & Pacheco Coelho, M. (2020). Technopreneurial intentions among Bulgarian STEM students: The role of university. *Sustainability*, *12*(16), 6455. https://doi.org/10.3390/su12166455

Zăvoianu, A., & Scarlat, C. (2024). Triadic models as a complex model: Technology-entrepreneurship-art of film. In *Proceedings of the International Conference on Business Excellence* (Vol. 18, No. 1, pp. 2411-2419). Sciendo. https://doi.org/10.2478/picbe

Zeb, N., ASajid, M., & Iqbal, Z. (2019). Impact of individual factors on women entrepreneurial intentions: With mediating role of innovation and interactive effect of entrepreneurial self-efficacy. *Journal of the Research Society of Pakistan*, *56*(2), 89.