



BUSINESS START-UP INTENTIONS AMONG TECHNICAL GRADUATES IN TANZANIA: THE MODERATING EFFECT OF ENTREPRENEURSHIP EDUCATION

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ABSTRACT

This paper examines the influence of entrepreneurship education on technical graduates' business start-up intentions. Specifically, it assesses the antecedents of business start-up intentions and how entrepreneurship education moderates the effect of attitudes towards business start-ups, societal-subjective norms, and perceived behavioural control on business start-up intentions. Data for this study were collected from 391 technical graduates who graduated between 2012 and 2017 from technical colleges and universities who lived in Dar es Salaam during data collection. The collected data were analysed using descriptive statistics and Partial Least Squares Path Modelling (PLS-PM). The findings indicate that perceived behavioural control (52.1%) was the strongest predictor of business start-up intentions, followed by attitude towards business start-up (28.9%), and societal-subjective norms (11.5%). Moreover, entrepreneurship education moderated the effect of attitudes towards business start-ups and perceived behaviour on business start-up intentions but not subjective norms. Only 30.2% of technical graduates' intentions translated into actual business start-ups. Limited start-up funds, perceived high taxes, unfriendly regulatory frameworks, and little awareness of business support services constrained the potential of graduates' intentions to translate into actual business start-ups. Alongside government efforts to improve the business start-up ecosystem, technical colleges and universities should align entrepreneurship courses with experiential pedagogies to enhance the attitudes of students towards business start-ups and perceived behavioural control as critical antecedents for business start-ups upon graduation.

Keywords: Business start-up intentions, Moderating effect, Entrepreneurship Education, Business Start-ups, Antecedents

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1. Introduction

In the world over, business start-ups are renowned for their potential to spearhead economic development through enhancing innovation, technological changes, and employment creation (Ashari *et al.*, 2022; Barba-Sanchez *et al.*, 2022). Policymakers and scholars are urged to understand the antecedents of



Business Start-up Intentions (BSI) among graduates to nurture their potential to venture into business start-ups (Malebana and Mothibi, 2022; Maheshwari *et al.*, 2022). Previous studies such as García-Uceda and Murillo-Luna (2022), Cui and Bell, 2022; and Otach *et al.* (2019) advocate that graduates' BSI is primarily determined by personal-level factors such as personality and background factors. In recognizing that the potential of graduates to venture into business start-ups stem from intentions, scholars such as Hoang (2021), Otach *et al.* (2019) and Maresch *et al.* (2016) urge university management and policymakers to consider entrepreneurship education as a strategic tool for enhancing students' intentions to venture into business start-up upon graduation. Therefore, the entrepreneurship courses should be integrated across programmes.

Traditionally, entrepreneurship courses were offered in universities and colleges with business and economics majors. However, recent trend analysis shows that entrepreneurship courses are offered to students outside business colleges and universities, particularly those majoring in Science, Technology, Engineering, and Mathematics (STEM) (Adelaja, 2021; Maresch *et al.*, 2016). These developments are not exception in Tanzania, whereas nearly all technical colleges and universities presently teach their students at least one standalone entrepreneurship course (Fulgence, 2015; Mwasalwiba, 2012). However, Maheresi (2022), Maheshwari *et al.* (2022) and Doang (2021) believe that graduates majoring in business and economics stand a better chance to benefit from entrepreneurship courses than their non-business counterparts. In addition, the entrepreneurial activities of scientific and technical graduates have a higher potential to create new and high-quality technology-oriented business ventures (Soomro and Shah, 2021; Åstebro *et al.*, 2012). Specifically, evidence shows that 71% of modern-day top 21st-century entrepreneurs do technology-related businesses, 9% do retail, 3% do entertainment, and 17% do other businesses (Legas, 2016).

Besides the high potential of technical graduates to venture into business start-ups, previous studies on entrepreneurial intentions overlooked the heterogeneity of graduates' educational backgrounds. Teixeira and Forte (2015) noted that 52% of studies addressed the entrepreneurial intentions of business students compared to only 3% of scientific and technical students. In Tanzania, existing empirical studies sampled respondents in folk development colleges (Nade, 2021), social works (Nyello *et al.*, 2015), business universities (Mangasini, 2015; Mwasalwiba, 2012), higher educational schools (Fulgence, 2015), and vocational schools (Rwamtoga, 2011). These studies mainly focused on assessing the teaching contexts, students' profiles, expectations, and outcomes of entrepreneurship education (Mwasalwiba, 2012), the status of entrepreneurship courses in higher educational schools (Fulgence, 2015) and the influence of entrepreneurship education on graduates' entrepreneurial tendencies (Mangasini, 2015), entrepreneurial behaviours (Nyello *et al.*, 2015), entrepreneurial intentions (Nade, 2021), and entrepreneurial development (Rwamtoga, 2011).

The preceding discussion confirms the dominance of entrepreneurial intentions of graduates in fields other than STEM. Given the narrow focus on the entrepreneurial intentions of STEM graduates in Tanzania, this paper empirically examines the intentions of technical graduates to venture into business start-ups. The motivation for this study stems from the fact that training programmes of technical colleges and universities are perceived to be potential attributable to positive BSI more than programmes at other training institutions (Legas, 2016; Åstebro *et al.*, 2012). In addition, since Fayolle's (2013) call on the need to employ research designs that include potential moderators on the relationship between entrepreneurship education and its learning outcomes, few empirical studies, if any, have responded to this call in the Tanzanian settings. Entrepreneurship research biased towards technical graduates' business start-up intentions is less prominent in Tanzania, where technical universities and colleges have steadfastly introduced entrepreneurship courses.

Consistent with Fayolle's (2013), this paper is set to examine the effectiveness of entrepreneurship courses considering that the effect of entrepreneurship education is contingent on contextual factors that vary significantly across regions (Ferreira *et al.*, 2016) and graduates' educational backgrounds (Teixeira and Forte, 2015). In addition, this paper partly responds to the recently meta-analysis studies by Maheshwari

et al. (2022) and Nabi *et al.* (2017) that call for context-specific studies in under-researched regions such as sub-Saharan Africa, particularly in Tanzania. Against this background, this study is an empirical attempt to address three key research questions: (i) Which antecedents determine the business start-up intentions of technical graduates? (ii) Does exposure to entrepreneurship courses moderate the effect of attitudes towards business start-ups, societal-subjective norms, and perceived behaviour on business start-up intentions? (iii) Do graduates' entrepreneurial intentions translate to business start-ups? Which are possible factors hindering such a transition?

The structure of this article is based on the orientation that: after the introduction, the second section presents theoretical foundations and an empirical literature review from which research hypotheses are derived. The third section presents the study methodology, where research design, sample size, measurement scales, common bias methods, and data analysis are specified. The fourth section presents and discusses the research findings, followed by the conclusion and implications of the study findings to the theory, practice and teaching.

2. Theoretical Grounding and Research Hypotheses

2.1 Antecedents of business start-up intentions

In order to enhance the potential of graduates in venturing into business start-ups, it was deemed important to explore the antecedents of BSI, particularly among technical graduates (Soomro and Shah, 2021; Maresch *et al.*, 2016). Although entrepreneurship education has often been treated as one of the external antecedents of BSI, internal factors play an equally important role (Cui and Bell, 2022; Maheshwari, 2021; Bae *et al.*, 2017). Drawing on Ajzen's (1991) Theory of Planned Behaviour (TPB) and the recent meta-analysis study by Maheshwari *et al.* (2022), the intentions to perform a given behaviour are frequently determined by three antecedents, namely: attitudes towards the behaviour, subjective norms, and perceived behavioural control. The internal antecedents of business start-up intentions are often grouped into personal-level and background factors (García-Uceda and Murillo-Luna, 2022; Liñan and Fayolle, 2015; Liñan *et al.*, 2011).

Attitudes towards Business Start-Ups (ATS) explain how individuals positively or negatively evaluate business start-ups (Malebana and Mothibi, 2022). Societal-Subjective Norms (SSN) measure the individual perception of the support received from society and significant-close people when starting business ventures (Entrialgo and Iglesias, 2016). Perceived Behavioural Control (PBC) is the belief about the ease or difficulty of a given task. It reflects how they believe to possess the required knowledge, skills and resources to start business ventures (Duong, 2021). Although these antecedents adequately predict BSI, their usefulness varies in different contexts (Entrialgo and Iglesias, 2016). As a deliberate and planned activity, business start-ups require personal preparedness, preceded by intentions (Kowang *et al.*, 2021; Shah *et al.*, 2020). Based on the TPB, it is assumed that BSI increases when graduates positively perceive that business start-ups conform to the norms and values of the public and that they fall within their ability and control.

Despite the importance of TPB antecedents, their influence on entrepreneurial intentions varies in different contexts (Ferreira *et al.*, 2016). Maheshwari (2021) concluded that TPB components exerted a substantial effect on entrepreneurial intentions that accounted for 30% to 45% of the variance than individual-level factors. The study by Kowang *et al.* (2021) reports that TPB antecedents had strong and more significant correlations with the entrepreneurial intentions of graduates than personality traits. Furthermore, entrepreneurial attitudes and perceived behavioural control are significantly associated with students' entrepreneurial intentions (Duong, 2021; Vuong, 2021; Mwasalwiba, 2012). However, these studies discovered that subjective norms did not significantly associate with the students' entrepreneurial intentions. In light of the inconsistent findings about the influence of these antecedents on entrepreneurial intentions, the study hypothesizes that:

H1. The attitude of technical graduates towards business start-up significantly influences their intentions to venture into business start-ups.

H2. *The societal-subjective norms of technical graduates significantly influence their intentions to venture into business start-ups.*

H3. *Technical graduates perceived behavioural control significantly influences their intentions to venture into business start-ups.*

2.2 Moderating effect of exposure to entrepreneurship courses

Exposure to entrepreneurship courses supposedly influences BSI through TPB antecedents by equipping students with the required entrepreneurial knowledge and skills useful in identifying and exploiting business opportunities (Maheshwari *et al.*, 2022). Despite their role, certain theoretical and empirical variations occur as it is not well established whether entrepreneurship courses affect BSI through TPB antecedents (Maheshwari, 2021; Otach *et al.*, 2019; Nabi *et al.*, 2017). Previous empirical studies assessing the direct and indirect effects of entrepreneurship courses on entrepreneurial intentions produced varying results, both significant and non-significant. A study by Odia and Odia (2019) confirmed that exposure to entrepreneurship courses had significant moderating effects on students' entrepreneurial intentions but adversely interacted with entrepreneurial attitudes, subjective norms, and perceived behavioural control.

Moreover, Longva and Strand (2020) reported a significant decrease in entrepreneurial intentions among students who studied entrepreneurship courses compared to those who did not. The findings support Adelaja and Minai's (2018) and Bouhaleb's (2020) findings that entrepreneurship courses did not significantly influence students' entrepreneurial intentions. Interestingly, their effect on entrepreneurial intentions varied based on the educational backgrounds of graduates (Teixeira and Forte, 2015). The study by Adelaja (2021) confirmed a significantly weak relationship between exposure to entrepreneurship courses and entrepreneurial intentions of non-technical students but no significant relationship among technical students after entrepreneurship courses. The combined sample showed no significant relationship between entrepreneurship education and entrepreneurial intentions. Entrialgo and Iglesias (2016) found weak subjective norms and perceived behavioural control among graduates who studied entrepreneurship courses than those who did not.

Moreover, Duong (2021) opines that the influences of entrepreneurship courses on entrepreneurial intentions through entrepreneurial attitudes and perceived behavioural control were much more substantial on students majoring in economics and business management compared to students majoring in science and engineering. Maresch *et al.* (2016) confirm that entrepreneurship courses significantly influenced the entrepreneurial intentions of business students but negatively affected the entrepreneurial intentions of non-business students. Furthermore, Barba-Sanchez *et al.* (2022) affirm that exposure to entrepreneurship courses had a moderate effect on entrepreneurial attitudes and perceived behavioural control on entrepreneurial intentions but not subjective norms of students. This implies that graduates' perceptions of the opinions of significant-close people such as parents, friends and society had a minor role in entrepreneurial intentions. The study by García-Uceda and Murillo-Luna (2022) reports that although exposure to entrepreneurship courses moderated the effect of entrepreneurial attitude, subjective norms, and perceived behavioural control on entrepreneurial intentions; however, their effects were partial and not positive.

The study by Duong (2021) underlined that exposure to entrepreneurship courses moderated the effect of entrepreneurial attitudes and perceived behavioural control on entrepreneurial intentions but did not directly influence entrepreneurial intentions. In other words, entrepreneurship courses indirectly influenced entrepreneurial intentions through entrepreneurial attitudes and perceived behavioural control. Contrary to that, the study by Ashari *et al.* (2022) affirmed that exposure to entrepreneurship courses did not increase the strength of entrepreneurial attitudes, subjective norms, and perceived behavioural control on entrepreneurial intentions. Specifically, students who did not study entrepreneurship courses had more positive entrepreneurial attitudes and intentions than those who studied. Given the contradicting findings, this paper extends this discussion by innovatively incorporating exposure to entrepreneurship courses as a moderator of the antecedents of BSI, drawing the experience of technical graduates in Tanzania to hypothesize that:

- H4. Exposure to entrepreneurship courses significantly moderates the effect of technical graduates' attitudes towards business start-ups on business start-up intentions.
- H5. Exposure to entrepreneurship courses significantly moderates the effect of technical graduates' societal-subjective norms on business start-up intentions.
- H6. Exposure to entrepreneurship courses significantly moderates the effect of technical graduates' perceived behavioural control to venture into business start-up intentions.

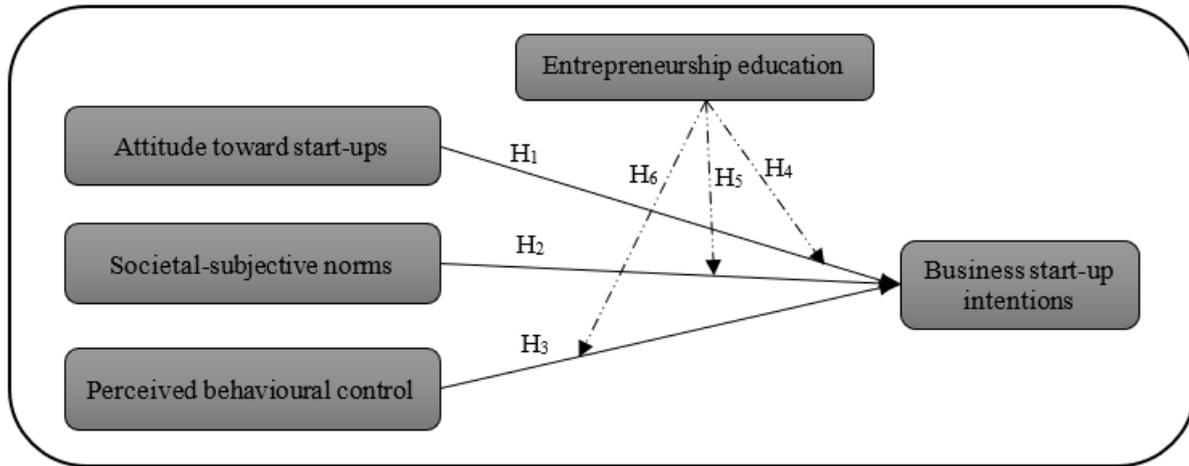


Figure 1: Theoretical framework and hypotheses

Key: —————> Direct effect - - - - -> Moderating effect

2.3 Potentials for intentions to translate into business start-ups

Despite the increase in entrepreneurship literature, previous studies have not adequately explored the potential of graduates' business start-up intention to translate into business start-ups (Cui and Bell, 2022). Considerable body of evidence shows that many graduates in the Least Developing Countries (LDCs) hold higher entrepreneurial intentions than those in developed countries (Iakovleva et al., 2014). However, empirical evidence to substantiate whether such intentions translate into business start-ups remains scanty (González-López et al., 2020). In addition, few studies examined what hinders the potential of such intentions to translate into business start-ups, especially in LDCs (Sharma, 2018; Iakovleva et al., 2014). The review of previous empirical studies shows that the potential of graduates' intentions to translate into business start-ups can be constrained by various obstacles that take different facets (Katundu and Gabagambi, 2016), and the definition of such barriers is context-specific (Sharma, 2018). This calls for country-specific studies, given the limited number of empirical studies on entrepreneurial intention obstacles in LDCs (Iakovleva et al., 2014).

In Tanzania, previous studies explored business start-up obstacles among graduates. Specifically, Mwantimwa et al. (2022) found that personal, sectoral, and macro-obstacles weaken students' intentions despite their firm intention to venture into entrepreneurial activities. Limited access to start-up capital, negative attitude toward business start-ups, bureaucratic and corrupt systems, lack of entrepreneurial skills, poor marketing, and taxation hindered quantity surveyors' business start-up potentials (Emmanuel et al., 2020). Wrong pedagogical methods, extended families, poor university programmes, limited business experience, and administrative systems hinder graduates' business start-ups (Katundu and Gabagambi, 2016). Mwasalwiba et al. (2012) reported that inhibitive banking and taxation, inadequate access to start-up capital and trusts, poor technology, corruption, and cheaply imported Chinese products discourage business start-ups. However, none of these studies examined the potential of BSI to translate into business start-ups and what hinders such potential, drawing the experience of technical graduates. This paper, therefore, examines the potential of BSI to translate into business start-ups and the obstacles hindering such potential.

3. Methodology

3.1 Study area, design and sampling

The study area on which this article is based was Dar es Salaam, Tanzania. Dar es Salaam was chosen because it is one of the fastest-growing cities in Africa, a country's commercial centre and an economic hub in Tanzania expected to acquire a megacity status by 2030 (Todd *et al.*, 2019). As a commercial hub, Dar es Salaam implements several technical projects that attract many technical graduates. Being the headquarter of official business registration through Business Registration and Licensing Agency (BRELA), Dar es Salaam accounts for 89.8% of all collections in the country (URT, 2017). In addition, several technical colleges and universities producing STEM professionals are in Dar es Salaam. These include the Dar es Salaam Institute of Technology (DIT), National Institute of Transport (NIT), St. Joseph University in Tanzania (SJUIT), College of Engineering and Technology (CoICT), Ardh University (ARU), College of Engineering and Technology (CoET), and International Medical and Technological University (IMTU). In that regard, and given the business opportunities in the city, many technical graduates were living in Dar es Salaam.

The paper employed a cross-sectional survey design where technical graduates' perceptions of the antecedents of BSI were collected once (Ragab and Arisha, 2018). Guided by the quantitative approach, it was possible to establish the relationship between the studied variables. The study involved technical graduates from CoET, DIT, and SJUIT who graduated between 2012 and 2017 and living in Dar es Salaam during data collection. The time frame was chosen based on Mwasalwiba's (2012) observation that many graduates are likely to start their first business venture five to ten years after graduation. Since SJUIT graduates had no exposure to entrepreneurship courses, their perceptions of BSI antecedents were compared against those exposed to it as an essential requirement for impact assessment studies (Fayolle, 2013). Technical graduates were chosen due to high potential to venture into high-quality business startups more than graduates in other professions (Åstebro *et al.*, 2012). This paper involved 384 technical graduates estimated through Cochran's formula at 95% confidence and ± 5% precision level (Cochran, 1977):

$$\text{Sample size (n)} = \frac{z^2 pq}{e^2} \dots\dots\dots(1)$$

Where n= sample size; z = confidence level at 95% (a standard value of 1.96); p = target population (since graduates living in Dar es Salaam were not known, a standard value of 0.5 was used); q = (1.0 – p); and e = Margin of error at 5% (standard value of 0.05).

$$\text{Therefore, } n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = \frac{3.8416 \times 0.25}{0.0025} = 384.16 \approx 384$$

Since the formula estimates a minimum sample size, 15% of the sample was spared to compensate for non-response potentials following Israel's (1992) recommendation, making the sample size 442. Fisher's *et al.* (1991) proportionate formula estimated the sub-sample for each university:

$$\text{Sample Size per University} = \frac{\text{Estimated Sample Size (n)}}{\text{Total Population (N)}} \times \text{Population per University (N)} \dots\dots\dots(2)$$

From equation (2), the sub-sample was computed as follows:

$$\text{CoET} = \frac{384}{10981} \times 2103 = 73, \quad \text{DIT} = \frac{384}{10981} \times 3818 = 134, \quad \text{SJUIT} = \frac{384}{10981} \times 5060 = 177$$

Table 1: Sub-sample size per technical university

University	Population	Sub-sample	Sub-sample with 15%	Percent (%)
CoET	2,103	73	84	19.2
DIT	3,818	134	154	34.7
SJUIT	5,060	177	204	46.1
Total	10,981	384	442	100

In Tanzania, it is mandatory for technical graduates to register in professional associations based on their fields of study, such as the Engineers' Registration Board (ERB), Contractors Registration Board (CRB), and the Architects and Quantity Surveyors Registration Board (AQRB). As a result, the contact information and location of the selected respondents were obtained from the respective registered

professional association. Unregistered respondents were identified through snowballing technique. A simple random sampling method using a random number Table was used to select respondents to avoid potential selection bias. The Structured Engineering Apprenticeship Programme (SEAP) recruits engineering graduates for three years to acquire hands-on professional experience (URT, 2005). Since many respondents were still working under SEAP, the data collection exercise was made simple as it was easy to access and confine them to this study. With the assistance of enumerators, 391 copies of the questionnaire were successfully collected out of 442 printed questionnaires. The returned questionnaires correspond to 88.5% of completion rate, which is above the threshold level of 70% for a survey paper (Nulty, 2008).

3.2 Measurement scale

A survey questionnaire was used to solicit responses from respondents whose items were adopted from previous literature with proven reliability (For details see Table 6). To confirm the questionnaire in the study context, a survey questionnaire was piloted to gain responses from 20 technical graduates in Moshi District that were excluded from the analysis. The strength of agreements or disagreements was measured through a five-point Likert scale using generic continuum responses ranging from Strongly Agree (=5) to Strongly Disagree (=1) due to inherent advantages over other scales (Johns, 2010). The Likert scale reduces respondents' frustration, enhances completion rate and response quality, and improves reliabilities (Babakus and Mangold, 1992; Jenkins and Taber, 1977).

3.3 Common method bias

Common Method Bias (CMB) is inherent in behavioural studies, mainly when the same survey questionnaire is used to collect data from similar respondents in the same location (Kock *et al.*, 2021). In addition to other techniques, Harman's one-factor test was used to test the potential bias by entering all the studied items as one factor in the Principal Component Analysis (PCA). Harman's one-test result produced 34.7% below the recommended threshold level of 50% (Kock *et al.*, 2021). This result entails that CMB was not challenging and had minimal implications on the empirical results.

3.4 Data analysis approaches

A second-generation technique known as Partial Least Squares Path Modelling (PLS-PM) was used to test the relationship between studied antecedents and BSI. PLS-PM was further used to examine the moderating effect of exposure to entrepreneurship courses on the relationship between the antecedents and BSI. PLS-PM was chosen since it examined both direct and indirect relationships of the constructs measured through multiple items (Hair *et al.*, 2021; Henseler *et al.*, 2016). In entrepreneurship, over 90% of published manuscripts in the past four years employed the PLS-PM technique (Manley *et al.*, 2020). The significance of path coefficients was estimated using Smart PLS software version 3.6 (Ringle *et al.*, 2015). Besides PLS-PM, descriptive statistics examined graduates' business start-up attempts and the potential obstacles drawing back technical graduates' efforts to translate their intentions into actual business start-ups.

4. Findings and Discussions

4.1 The measurement models

The evaluation of the reflective outer model involved the use of Cronbach's Alpha (α), Composite Reliability (CR), Jöreskog's Rho_A, and Factor Loading (FL) to determine the reliability and validity of the constructs. Table 2 shows that all the constructs were reliable with α , CR, Rho_A, and FL ($\geq .70$) (Hair *et al.*, 2019, 2021; Chin, 1998; Cronbach, 1951). Both items and constructs reflected adequate internal consistency reliability for further analysis. Average Variance Extracted (AVE) and individual indicator reliability was used to assess the convergent validity of the constructs. The AVE values for all the constructs attained the threshold level (≥ 0.50) (Hair *et al.*, 2019, 2021). This entails that the constructs interpret over 50% of the variance of its items, confirming the constructs' convergent validity (Hair *et al.*, 2019, 2021; Manley *et al.*, 2020).

Table 2: Construct reliability and validity

Construct	Items	Loadings	VIF	CR	Rho_A	α	AVE
ATS	ATS_1	0.866	2.225	0.899	0.862	0.850	0.691
	ATS_2	0.734	1.518				
	ATS_3	0.849	2.133				
	ATS_4	0.869	2.279				
SSN	SSN_1	0.912	2.559	0.929	0.898	0.886	0.813
	SSN_2	0.871	2.288				
	SSN_3	0.922	3.077				
PBC	PBC_1	0.836	2.149	0.920	0.894	0.892	0.698
	PBC_2	0.845	2.454				
	PBC_3	0.870	3.091				
	PBC_4	0.834	2.565				
	PBC_5	0.790	1.810				
BSI	BSI_1	0.738	1.726	0.920	0.896	0.895	0.658
	BSI_2	0.858	2.675				
	BSI_3	0.814	2.181				
	BSI_4	0.780	1.974				
	BSI_5	0.819	2.239				
	BSI_6	0.852	2.607				

Variance Inflation Factor (VIF), Composite Reliability (CR), Jöreskog's Coefficient (Rho_A), Cronbach's Alpha (α), and Average Variance Extracted (AVE).

Fornell-Larcker criterion, cross-loadings, and the heterotrait-monotrait ratio (HTMT) were used to assess the discriminant validity of the measurement model. Cross-loadings explain how strongly each indicator loads on the other constructs. As a rule of thumb, the outer loadings should be above all its loadings on different constructs. Table 3 show that the outer loadings were more significant than their loadings on other constructs, indicating no discriminant validity challenge. Fornell-Larcker criterion was used to assess discriminant validity by comparing the square root of the AVE values with the latent variable correlations. The rule of thumb requires that the square root of each construct's AVE value be above its highest correlation with other constructs (Fornell and Larcker, 1981). The results indicate that all the constructs attained the discriminant validity criterion.

In addition, the square root of each construct's AVE value was above the correlation that the construct had with other constructs (Fornell and Larcker, 1981). Lastly, Heterotrait-Monotrait (HTMT) was used to assess discriminant validity. The validity is attained when HTMT meets the threshold level (≤ 0.850) (Hair *et al.*, 2019; Henseler *et al.*, 2016). All HTMT values in Table 3 attained the correlation strength of (≤ 0.850). The reflective measurement outer model generally indicates that the scales display acceptable psychometric properties suitable for further analysis.

Table 3: Discriminant validity

Constructs	ATS	BSI	PBC	SSN
<i>Fornell and Larcker Criteria</i>				
ATS	0.831			
BSI	0.638	0.811		
PBC	0.575	0.744	0.835	
SSN	0.426	0.495	0.494	0.902
<i>Cross-loading</i>				
ATS_1	0.866	0.579	0.486	0.371
ATS_2	0.734	0.445	0.381	0.282
ATS_3	0.849	0.503	0.487	0.312
ATS_4	0.869	0.578	0.545	0.437
BSI_1	0.497	0.738	0.619	0.375
BSI_2	0.525	0.858	0.646	0.461
BSI_3	0.560	0.814	0.585	0.450
BSI_4	0.487	0.780	0.575	0.342
BSI_5	0.506	0.819	0.606	0.381
BSI_6	0.525	0.852	0.587	0.394
PBC_1	0.542	0.671	0.836	0.438
PBC_2	0.454	0.588	0.845	0.395
PBC_3	0.429	0.628	0.870	0.354
PBC_4	0.420	0.551	0.834	0.462
PBC_5	0.542	0.652	0.790	0.415
SSN_1	0.393	0.500	0.439	0.912
SSN_2	0.326	0.395	0.442	0.871
SSN_3	0.430	0.435	0.457	0.922
<i>Heterotrait – Monotrait Ratio (HTMT)</i>				
ATS				
BSI	0.727			
PBC	0.652	0.828		
SSN	0.484	0.550	0.557	

4.2 Structural model assessment

The model explained variance (R²) advocates a sufficient explanatory power of antecedents on a structural model assessment is used to evaluate the relationship between latent constructs and validate the conceptual framework (Hair et al., 2021). The inner model evaluation involved path analysis based on the relationship between latent exogenous and endogenous construct. The model explained variance (R²) show a sufficient explanatory power of antecedents on BSI with R² = 0.629(ATS = 0.289, SSN = 0.115, PBC = 0.521). Impliedly, PBC (52.1%), ATS (28.9%), and SSN (11.5%) account for 62.9% of the variance in BSI. The remaining 37.1% of the variance in BSI is perhaps accounted for by other factors not covered in this paper. The 62.9% variance is fairly above the 30% reported by Mwasalwiba (2012) in Tanzania, 39% by Ndofirepi and Rambe (2017) in Zimbabwe, and 53% by Shah *et al.* (2020) in Oman. Maheshwari (2021) emphasizes that TPB antecedents account for 30 to 45% of the variance in entrepreneurial intentions.

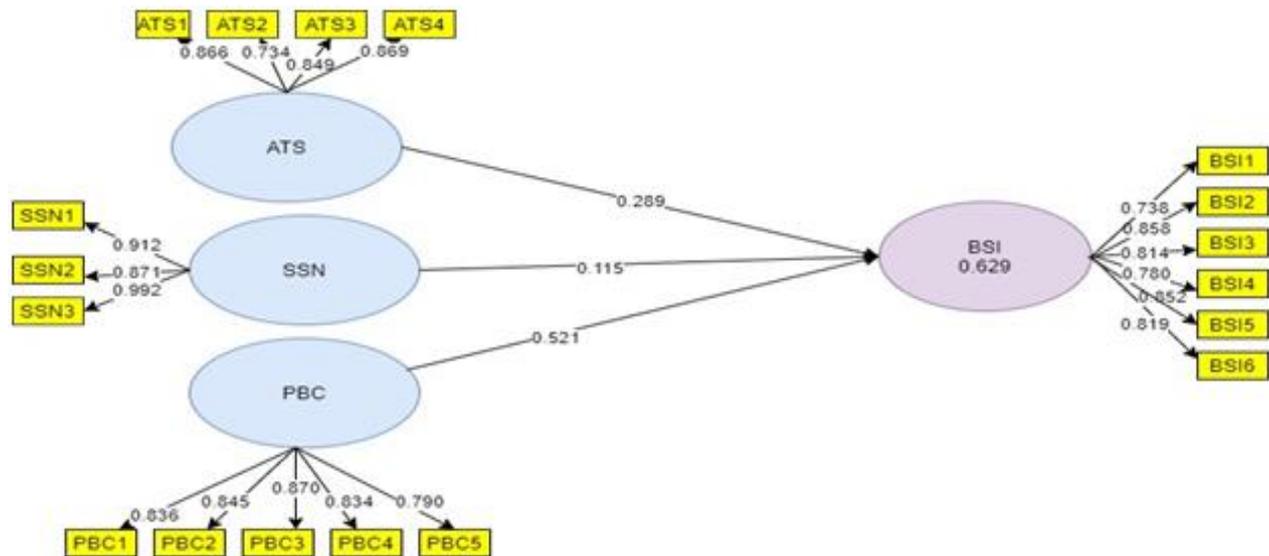


Figure 2: A path analysis

For direct effect, the path values shown in Table 4 uphold that ATS ($\beta = 0.289, p < 0.05$), SSN ($\beta = 0.115, p < 0.05$), and PBC ($\beta = 0.521, p < 0.001$) directly and significantly influence BSI, supporting hypotheses $H1, H2$, and $H3$. Attitudes towards business start-ups, societal-subjective norms, and perceived behavioural control substantially affect graduates' BSI. Indeed, graduates with positive attitudes towards business start-ups, subjective norms and perceived behavioural control are more likely to venture into business start-ups than those with negative perceptions. Entrepreneurship courses should foster positive attitudes towards business start-ups, societal-subjective norms and perceived behavioural control. Unlike Kowang *et al.* (2021), who reported that entrepreneurial attitude was the primary predictor of entrepreneurial intentions among Malaysian undergraduates, within the context of technical graduates in Tanzania, perceived behavioural control (52.1%) is the strongest predictor of BSI followed by attitudes (28.9%) and subjective norms (11.5%).

Table 4. Direct paths of the antecedents on business start-up intentions

Hypotheses	Path	Path coefficient	t-statistics	p-value	Supported
$H1$	ATS → BSI	0.289	3.017	0.003**	Yes
$H2$	SSN → BSI	0.115	2.002	0.046*	Yes
$H3$	PBC → BSI	0.521	7.215	***	Yes

Legend: ** $p < 0.01$, *** $p < 0.001$

Consistent with TPB and previous empirical studies, this study confirms that the intentions of technical graduates to venture into business start-ups were predicted by the attitudes towards business start-ups, social pressure about business start-ups, and perceived behavioural control (Malebana and Mothibi, 2022; Maheshwari, 2021; Vuong, 2021; Ajzen, 1991). Besides perceived behavioural control, graduates with a positive attitude towards business start-ups have a higher potential to venture into business start-ups than those with negative perceptions. However, some empirical studies, including the study by Longva and Strand (2020) and Bouhaleb (2020), reported a non-significant and significant decrease in entrepreneurial attitudes and perceived behavioural control on graduates' entrepreneurial intentions. Although several empirical studies reported that subjective norms did not significantly influence entrepreneurial intentions (Malebana and Mothibi, 2022; Duong, 2021; Vuong, 2021; Odia and Odia, 2019; Mwasalwiba, 2012), in this study, subjective norms are significant though it contributes marginal effect on business start-up intentions.

Furthermore, the moderating effect of exposure to entrepreneurship courses was captured by running two models comprising graduates with exposure (Figure 3) and those without entrepreneurship (Figure 4) to compare their path coefficients and *p*-values.

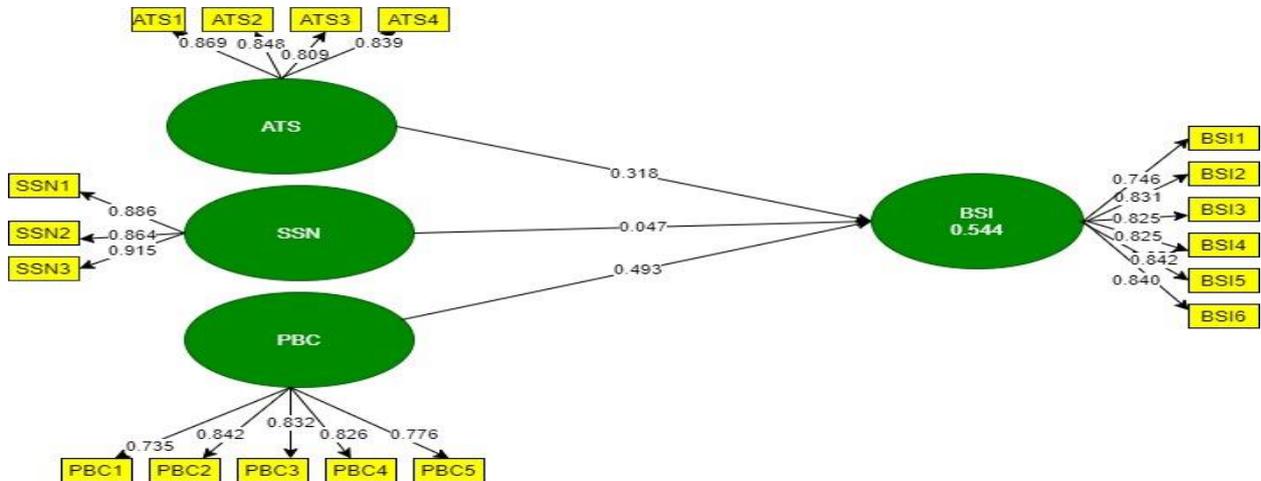


Figure 3: A path model with exposure

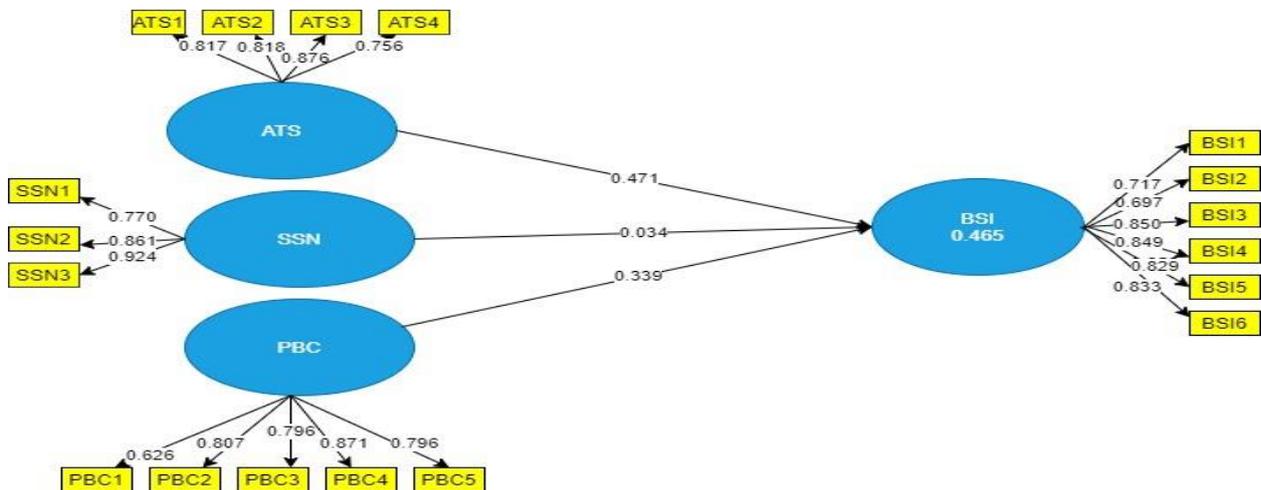


Figure 4: A path model without exposure

Figure 3 shows that the model with exposure to entrepreneurship courses as moderator predicted $R^2 = 54.4\%$ (ATS=31.8%, SSN=4.5%, PBC=49.3%). However, in a model without a moderator, the predictive model ability changed from 54.4% to $R^2 = 46.5\%$ (ATS = 47.1%, SSN = 3.4%, PBC = 33.9%). The changes imply that entrepreneurship courses moderate the predictive ability of attitudes towards business start-ups, societal-subjective norms, and perceived behavioural control to jointly predict 54.4% of the variance in business start-up intentions (Figure 3). Without moderating the effect of exposure to entrepreneurship courses, the model could predict only 46.5% of the variance in BSI (Figure 4).

Table 5: Comparison of moderated and non-moderated paths

Hypotheses	Path	With exposure			Without exposure			Supported
		β	t-values	p-values	β	t-values	p-values	
H4	ATS → BSI	0.318	2.970	0.003**	0.471	6.209	***	Yes
H5	SSN → BSI	0.047	0.185	0.853	0.034	0.437	0.662	No
H6	PBC → BSI	0.493	5.750	***	0.339	3.863	***	Yes

Legend: ** $p < 0.01$, *** $p < 0.001$

Consistent with previous empirical studies, the findings confirm that entrepreneurship courses equip graduates with entrepreneurial knowledge and skills critical to enhancing their attitudes towards business start-ups (Maheshwari, 2021; Kowang *et al.*, 2021; Doang, 2019). The findings imply that entrepreneurship courses significantly moderate the effect of attitude towards business start-ups on business start-up intentions. Table 5 shows the impact of ATS on BSI in the model with exposure ($\beta = 0.318, p < 0.01$) and without exposure ($\beta = 0.471, p < 0.001$). Although the p -values in both models were significant, thus supporting hypothesis H4, the path coefficient of the model with exposure (31.8%) is lower than that without exposure (47.1%). The difference implies that besides entrepreneurship education, informal exposure such as entrepreneurial parents, previous employment experience, business ownership experience, business start-up experiences, and entrepreneurial role models in family and friends are critically important in shaping the attitudes of graduates towards business start-ups.

Moreover, the effect of SSN on BSI was not significant in both models with and without exposure ($p > 0.05$); consequently, hypothesis H5 was not supported. This implies that entrepreneurship courses do not strengthen the perceptions of technical graduates on the opinions of significant-close people such as parents, friends, business associates, and the general society in predicting their intentions to venture into business start-ups. The effect of PBC on BSI was significant in both models with exposure ($\beta = 0.493, p < 0.001$) and without exposure ($\beta = 0.339, p < 0.001$). Since the path coefficient of PBC in the model with exposure (49.3%) was fairly higher than that in the model without exposure (33.9%), and the p -values are significant on both sides, it is evident that hypothesis H6 is supported. Impliedly, entrepreneurship courses significantly moderated the effect of perceived behavioural control on business start-up intentions. The study findings contradict Kowang *et al.* (2021), who reported that entrepreneurship courses scored lower correlation coefficients with entrepreneurial intentions than other antecedents among the studied antecedents. The findings further contradict studies by Malebana and Mothibi (2022), Maheshwari (2021) and Doang (2019), who reported that exposure to entrepreneurship courses did not moderate the effect of entrepreneurial attitudes on entrepreneurial intentions but positively moderated the effect of perceived behavioural control on entrepreneurial intentions.

In addition to measuring the intentions of technical graduates to venture into business start-ups, the study further measured the extent to which such intentions translate into business ventures and the factors hindering such transition. To make it clearer, the study measured graduates' intention to start business ventures but without success because they ended up with just a dream and gave-up before the venture was materialised. Descriptive statistics were used to examine technical graduates' attempts to translate business start-up intentions into the reality and the associated obstacles. This was done for the group of technical graduates who started the business venture but the venture did not last longer (business failure) that means business start-ups dreams were realised but the owners failed to maintain the venture as most of which failed within a year of operation. The findings show that 10% of graduates had never thought of business start-ups, 9.1% thought of it but never acted, and 10.5% tried to start a business venture but gave-up. Moreover, 9.2% tried to start business ventures but failed, 18.7% were in the start-up process, and 30.2% had established business ventures that were still operating. Although the business start-up rate of 30.2% for technical graduates is low relative to the level of investment, which is much higher than the 22.7% business start-up rate for business-related graduates reported by Mangasini (2015). The findings could perhaps imply that many technical graduates still depend on ready-made job opportunities in private and public sector organizations during this study. These results partly support Legas's (2016) and Åstebro's *et al.* (2012) assertion that technical graduates have higher business start-up potential than graduates of other fields. The findings partly contribute to the knowledge-base on whether students' intentions translate to actual business start-ups (González-López *et al.*, 2020).

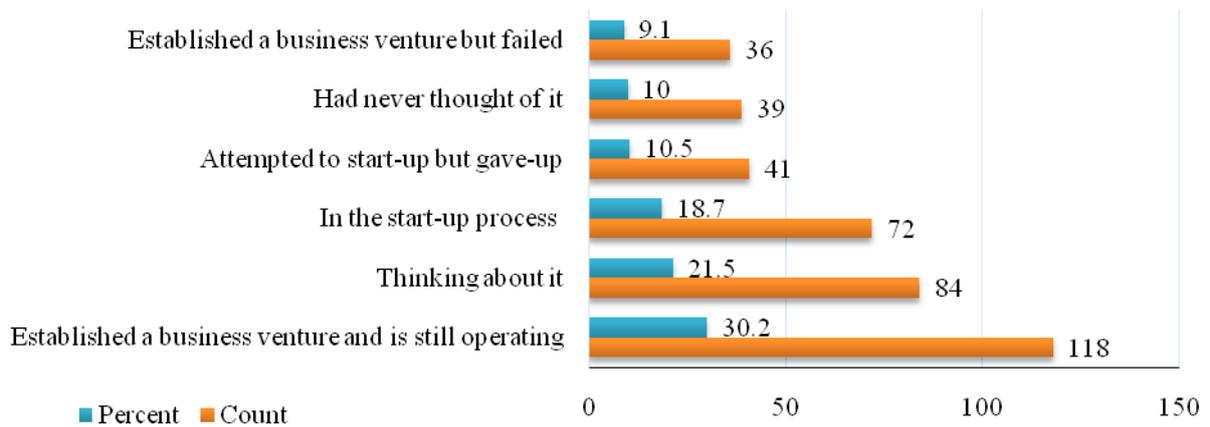


Figure 5: Status of business start-ups

Lastly, the study examined factors drawing back technical graduates' attempts to translate start-up intentions into business start-ups. The findings shown in Figure 6 confirm that although technical graduates were interested in the start-ups, their attempts to transform business start-up intentions into business start-ups were obstructed by limited access to start-up capital (86.2%), perceived high taxes (69.1%), unfavourable regulatory frameworks (62.7%), unfriendly business environment (61.1%), and limited awareness of where and how to access business support services (60.1%) among others. These obstacles seem to dominate entrepreneurship studies in Tanzania (Mwantimwa *et al.*, 2022; Emmanuel *et al.*, 2020; Mangasini, 2015; Mwasalwiba *et al.*, 2012).

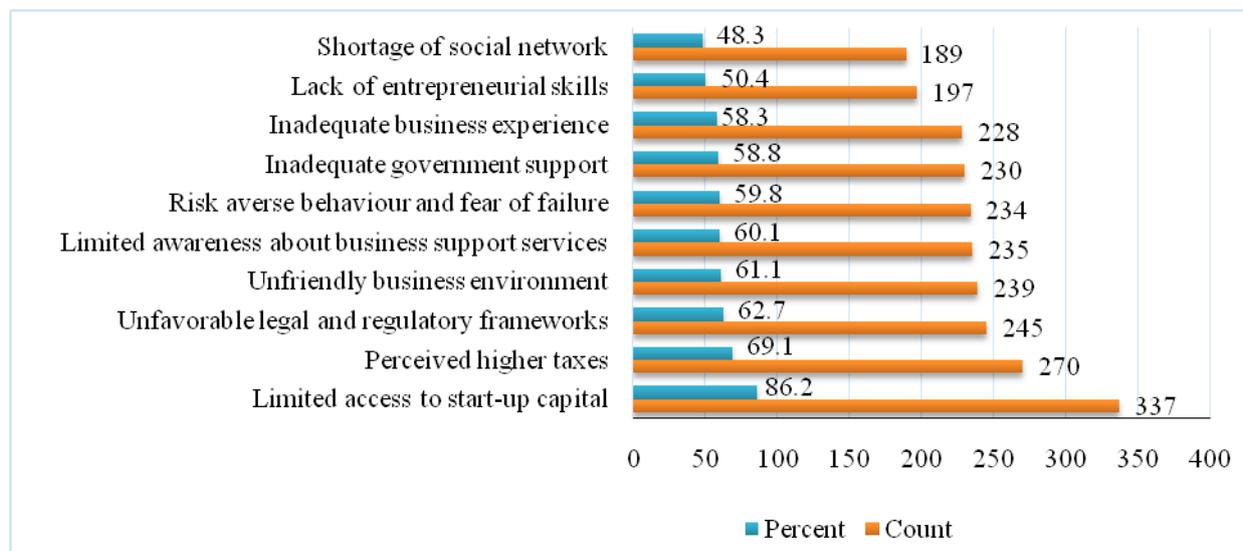


Figure 6: Business start-up obstacles

5. Conclusions and recommendations

This empirical paper attempted to examine the antecedents of business start-up intentions and how exposure to entrepreneurship courses moderated the effect of attitudes towards business start-ups, subjective norms, and perceived behaviour on business start-up intentions. Consistent with previous theoretical and empirical studies from different contexts, this study concludes that attitudes towards start-ups, societal-subjective norms, and perceived behavioural control significantly influence business start-up intentions. Within the context of technical graduates in Tanzania, perceived behavioural control (52.1%) was the strongest predictor of business start-up intentions, followed by attitudes towards business start-ups (28.9%) and subjective norms (11.5%). It is concluded that technical colleges and universities should employ experiential pedagogies that capitalize on developing perceived behavioural control and attitudes towards business start-ups to enhance technical graduates' potential to venture into business start-ups.

The study concludes that exposure to entrepreneurship courses moderated the effect of attitudes towards business start-ups and perceived behaviour on business start-up intentions. However, they did not moderate the impact of subjective norms on business start-up intentions. This evidence indicates the strength of the influence of social contexts (social norms) and the role of entrepreneurship courses on entrepreneurial intentions. Based on the study findings, it is concluded that graduates' perceptions on opinions of significant-close people such as parents, friends and members of society played a minor role in predicting their business start-up intentions. Otherwise, limited access to start-up capital, unfavourable regulatory frameworks and business environment, perceived high taxes, and little awareness of business support services constrained technical graduates' intentions to translate their intentions into business start-ups. Local Government Authorities (LGAs) should improve the existing start-up environment for university graduates to exploit the abundant untapped entrepreneurial opportunities to establish a business venture to create self-employment and employment opportunities for others.

5.1 Theoretical and practical implications

The study findings present theoretical and practical implications to entrepreneurship scholars and policymakers in Tanzania. *First*, perceived behavioural control was the most significant antecedent of technical graduates' business start-up intentions, followed by attitudes towards start-ups and societal-subjective norms. Curriculum designers in technical colleges and universities should design courses that enhance students' perceived behavioural control and attitude towards start-ups. *Second*, since entrepreneurship courses did not moderate the effect of subjective norms on business start-up intentions, colleges and universities should design solid entrepreneurship courses around social and cultural norms while aligning them with experiential teaching methods to improve students' entrepreneurial skills to venture into business start-ups. LGAs should broadcast success stories of successful entrepreneurs through media to entice youths to follow them as role models.

Societal members appraise individuals employed in the formal sector while disregarding self-employed individuals in the informal sector through small business ventures. Publicising success stories of self-employed individuals in the informal sector could dispel this behaviour and improve graduates' subjective norms critical in business start-ups. This paper contributes to the body of entrepreneurship knowledge in two ways. *First*, it explores the antecedents of business start-up intentions drawing the experience of graduates from relatively untapped degrees in STEM. *Second*, it shows entrepreneurship courses moderate the effect of attitudes towards start-ups, subjective norms, and perceived behavioural control on business start-up intentions following Fayolle's (2013) call on research designs that include moderators with treatment and control groups. Therefore, the paper confirms TPB's applicability as a theoretical framework helpful in assessing the potential of technical graduates to venture into business start-ups in Tanzania.

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Appendix

Table 6. Measurement scales

Construct	Measurement items	Source
ATS	1. A career as an entrepreneur is attractive to me.	Doang, 2021; Liñán <i>et al.</i> , 2009
	2. If I had the resources, I would choose to start my business venture.	
	3. I would be satisfied if I became an entrepreneur.	
	4. Among the options, I would instead choose to be an entrepreneur.	
SSN	1. My closest family would approve if I decided to start a business venture.	Doang, 2021; Liñán <i>et al.</i> , 2011
	2. My closest friends would approve if I decided to start a business venture.	
	3. If I decided to start a business venture, people who are important to me would approve of that decision.	
PBC	1. To start a new business and keep it working would be easy for me.	Doang, 2021; Liñán <i>et al.</i> , 2011
	2. I can control the creation process of a new business venture.	
	3. I understand the practical details of starting a business venture.	
	4. I know how to develop an entrepreneurship project.	
	5. If I tried to start a business, I would have a high chance of succeeding.	
BSI	1. I have seriously thought of becoming an entrepreneur.	Doang, 2021; Liñán <i>et al.</i> , 2011
	2. My professional goal is to become an entrepreneur.	
	3. I am ready to do anything to become an entrepreneur.	
	4. I have a serious intention to start a business some days in future.	
	5. The probability of becoming an entrepreneur is high.	
	6. If I had the opportunity and resources, I would start my own business.	