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MANAGEMENT | RESEARCH ARTICLE

Business incubation practices and sustainability of incubatee start-up firms in Uganda

Bob Ssekiziyivu^{1*} and Yoram Banyenzaki²

Abstract: The purpose of this study was to establish the relationship between business incubation practices and sustainability of incubatee start-up firms in Uganda using business incubation theory and network theory. A quantitative methodology is used for data collection based on 110 incubatee start-up firms from 8 incubators in Uganda. It is a cross-sectional descriptive study, which investigates the causal effect of variables at a definite point in time. A principal factor analysis was conducted to single out the particular constructs of business incubation practices and sustainability. Simple random sampling was used for selecting start-ups from the incubation centres. The sampling framework consists of the founders of the start-ups that have been previously incubated at any of the selected incubation centres. Data were analysed using Statistical Package for Social Sciences. Incubatee selection criteria, incubatee monitoring practices and resources have a positive and significant impact on sustainability of incubatee start-up firms. The study has emphasised good business incubation practices to enable sustainability of start-up firms in Uganda. This study was limited to only incubators in Uganda and it is possible that the results are only applicable in Uganda. This paper adds to the limited business incubation literature and provides the first empirical evidence of business incubation practices on sustainability of incubatee start-up firms in Uganda.



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PUBLIC INTEREST STATEMENT

Several initiatives have been put in place by government of Uganda, the private sector as well as development partners to salvage the continuous collapse of start-ups in Uganda. Key among them has been business incubation which has been identified as an effective growth mechanism for such entrepreneurial firms. This study has identified a linkage between specific business incubation practices such as incubatee selection criteria, incubatee monitoring and resources and how they affect the sustainability of start-ups in Uganda. Thus this paper helps entrepreneurs, start-up firms, incubators and policy makers to well understand issues of selection criteria, monitoring and resources could be handled to enable the sustainability of start-ups. The study recommends aspects of market characteristics, owners' attributes and product characteristics to be given attention prior to admission of any incubatee start-up firm into the incubator. This will reduce the likelihood of failure and increase chances of success of start-ups.

Subjects: Critical Management Studies; Entrepreneurship and Small Business Management; Entrepreneurship

Keywords: business incubation; sustainability; incubatee start-up firms; Uganda

1. Introduction

In this paper we report results on the influence of specific business incubation practices on the sustainability of incubatee start-up firms in Uganda using the business incubation theory and networking theory. Globally, the move to acknowledge the role of business incubation with regards to nurturing sustainable start-ups has gained grip over the years (Chenge & Schaeffer, 2011). According to Mohammed et al. (2017), business incubation plays a critical role of sustaining ailing businesses by providing a wide range of assistance in form of office equipment, computer equipment/services, business plan and product development, affordable office space, training facility/coaching, legal counseling/intellectual property and business networking. From an operational or business outlook, business incubators are considered as a great support for entrepreneurs, as they offer them an adequate ecosystem for the of new companies, helping them both to recognise new business opportunities and to provide support in the three basic functions of entrepreneurship: innovation and technological development; financial risk; and administrative management of the business, to guarantee its sustainability (Fernández Fernández et al., 2015; Lukeš et al., 2019; Zapata-Guerrero et al., 2020). In addition, business incubators not only provide support for the creation of new businesses but are also considered key organisations for their growth and development (Cooper, 1985; Lukeš et al., 2019). From a government or public policy perspective, business incubators have become a key tool to promote entrepreneurship and the creation of new businesses, as they are considered a key factor for job creation, economic growth and strengthening of the business fabric. Likewise, it has recently been shown that incubators the generation of start-ups and the development of innovation (Lukeš et al., 2019; Zapata-Guerrero et al., 2020).

Business incubation has taken shape in almost all countries, especially in the developing countries. For example, South Africa has over 20 incubators supporting entrepreneurs in sectors such as horticulture, construction, chemicals, ICT, biotechnology, metal fabrication, furniture manufacturing and platinum beneficiation. While there are a few private sector-led incubators like Raizcorp, most are supported by the national government and to a lesser extent by provincial and local governments (InfoDev, 2019). In Ghana, most incubators focus on basic services like access to facilities, connectivity and support services, as well as the possibility to interact with other entrepreneurs while in Angola, the National Institute for Employment and Vocational Training serves as a one-stop business service centre with offerings such as training workshop in entrepreneurship, business advisory and consulting services, credit facilitation, linkage and referrals. This incubator focuses particularly on youth in the context of a post-conflict environment. In Rwanda, the Kigali Institute of Science and Technology, the Technology and Business Incubation Facility (TBIF) provides office space, shared resources and a seed-financing scheme to 20 Incubatees, many of whom are young students from its academic community (InfoDev, 2019). In Uganda many private and government incubators have been established to offer incubation services and in fact have undoubtedly attracted the attention of budding entrepreneurs to access and benefit from such services (Abaho & Nkambwe, 2017). Several incubators have been setup to provide a variety of business support functions without a national guideline on the minimum service standard (Private Sector Department Unit (PSDU) paper, 2018).

Though these business incubators have been designed to provide critical support to vulnerable businesses, there is considerable evidence to suggest that the failure of start-ups persists even while on these programmes (Mohammed et al., 2017). Start-ups have persistently failed either from within the incubator, immediately after graduating from the incubators or even after some

few years after graduation (Ojiambo, 2016; Orobia et al., 2020). For example, out of the 10 start-ups that joined Makerere University Business School Entrepreneurship Innovation and Incubation Centre (MUBS-EIIC) program in October 2017, only one incubatee start-up graduated from the incubator successfully and was able to stand freely (Makerere University Business School Entrepreneurship Innovation and Incubation Centre [MUBS-EIIC], 2019).

Prior studies document a number of determinants of sustainability of incubatee start-up firms for example, education system (Hassan, 2020;), financial access (Blok et al., 2017; Zaidi et al., 2021), government support and managerial skills (Zaidi et al., 2021), coopetition (Theodoraki et al., 2020) and managerial decisions (Fernández-Nogueira et al., 2018). In the presence of all the above studies, there seems to be no study that has interrogated the relationship between specific business incubation practices (incubatee selection criteria, incubatee monitoring and resources) and sustainability of start-up firms using evidence from Uganda's incubators. We fill this research gap by reporting that incubatee selection criteria, incubatee monitoring and resources predict 36.5% of the variation in sustainability. Our results also demonstrate that incubatee selection criteria and incubatee monitoring practices are significant predictors of sustainability of start-ups firms in Uganda while resources is not. We enlist responses based on 110 incubatee start-up firms from 8 incubators in Uganda using a self administered questionnaire designed on a 4-point Likert scale. This study makes use of perceptions from the business owners as opposed to generating responses from national experts. We believe that the consumers of incubation services are in a better position to provide information about what is truly on the ground. The study also makes use of field data as opposed to panel data.

The significance of this paper is threefold; to the policy makers, it guides the government on how to improve business incubation services in order to sustain start-ups. Academically, it presents the debate about the effectiveness of business incubation services while practically, the paper presents business incubation from the nascent entrepreneurship perspective and suggests pragmatic interventions that can improve the effectiveness of business incubation practices. We suggest that policy makers and management of start-up firms use this study results to enhance their operations.

The remainder of the paper is structured as follows. The next section is the study setting, which is followed by a literature review and then methodology. Study results are presented in Section 5, followed by discussion of findings in Section 6. The last section is the summary and conclusion.

2. Study setting

This study was conducted in Uganda. Uganda is a developing country found in East Africa. It is landlocked and its history is characterised by civil wars and political unrest. Uganda was colonised by the British and this would imply that the country's business systems are similar to those of the British government. However, this may not be the case. There have been several efforts in Uganda to set up incubation centres since the post-independence days (1960s). This is because the incubation centres would provide support to SMEs, foster research and development, encourage innovation and learning, and nurturing start-up businesses (Mutambi et al., 2010). These incubation centres have been set-up in universities and research institutions to help business start-ups while providing laboratories for students and entrepreneurs in which to experience the real world of business. According to Abaho and Nkambwe (2017), business incubation in Uganda has been well received at different levels providing different services for example, institutions of higher learning such as Makerere University, Makerere University Business School and Kyambogo university have established business incubation centres to develop and churn out strong and self-sustaining businesses to drive the economic transformation of Uganda. Surprisingly, there are still a number of business start-ups that fail to graduate to the next level. Undertaking a study of this nature in such a country is a worthwhile endeavor.

3. Literature review

3.1. Theoretical review

The contribution of business incubation practices on sustainability of start-ups is supported by the business incubation theory. The business incubation theory by Hackett and Dilts (2004a), looks at sustainability of incubatee start-ups in terms of incubatee growth and financial performance at the time of incubator exit as being a function of the incubator's ability, developed over time and with the accumulation of innovative venture development capabilities and resources, to create options through the selection of weak-but-promising intermediate potential firms for admission to the incubator, and to exercise those options through monitoring and business assistance practices, and the infusion of resources. The business incubation theory justifies this study as it expands on some of the variables that are to be investigated in this study. The need to integrate theoretical foundations and practice motivated the researchers to further investigate the relationship between business incubation practices and sustainability of incubatee start-up firms in Uganda. This is particularly so, because previous studies have marginally engaged incubators or incubatees along these lines and have confirmed this evidence. For instance, Cullen et al. (2014) and Loose et al. (2016), focused on incubator service and sustainability and still realised that there were challenges surrounding sustainability of start-ups hence calling for further research studies in the same phenomena.

Network theory on the other hand focuses on the function of networking and social interaction in incubators (Sungur, 2015). The argument of this theory is that business incubators help incubatees to form and develop their networks within the incubator as well as externally, and the networks developed by an incubatee due to an incubator influence start-up formation and graduation, and thereby performance of the incubator (Eveleens et al., 2016). An incubatee may have its own network of resources acquired through modes of education and/or work experience that are valuable in the critical phase of start-up formation. These are called "private" external networks, acquired mainly through the start-ups' own efforts, which are labeled as "idiosyncratic," as they are unique to an incubatee and they satisfy the specific needs of that start-up (Pettersen et al., 2015). A prospective start-up while undergoing incubation in a business incubator would make use of networks that the business incubator provides in the form of access to resources and capabilities, knowledge and learning, and social capital, to complement with its own.

3.2. Sustainability of incubatee start-up firms

According to Scaramuzzi (2002), sustainability of a start-up is the ability to maintain its objectives and stand on its own and be able to post a positive cash flow. The researcher adds that the ability of the business incubator management to guarantee success of incubatee start-ups is measured based on its capability to raise funds, employ qualified people and maintain the resources needed to run the incubation process efficiently and effectively to support graduation of the incubatees as well as survive as an incubator. Hence sustainability, in this context is the ability to achieve continuous improvement and obtain a positive cash flow from partnerships and stakeholders (Zapata-Guerrero et al., 2020).

3.3. Business incubation practices and sustainability of start-up firms

The National Business Incubation Association (National Business Incubator Association [NBIA], 2010), defines business incubation as a business support process that accelerates the successful development of start-up and inexperienced companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or coordinated by incubator management and offered both in the business incubator through its network of contacts. The concept ensures that firms overcome what is called the liability of newness and the liability of smallness thereby creating innovative firms that are competitive, profitable and sustainable (Salvador & Rolfo, 2011). The incubation phenomenon is therefore considered an enabling technology that capacitates the functionality of critical and possibly strategic technologies (Hackett &

Dilts, 2004a). This study considers business incubation practices to include incubatee selection criteria, Incubatee monitoring and resources.

3.4. Selection criteria and sustainability of start-ups

Incubatee selection processes and the criteria used to select incubator clients have become paramount to the success of the business incubator. This contention is supported by Kibai (2018), who argued that a crucial point for the success of any incubator is indisputably the selection process of prospective companies. Kibai (2018) states that the number of graduated companies will be directly proportional to the quality of the selection process. As a result, the goals of any selection process should be to identify those business proposals that have a greater chance of success. Being selective ensures that only high quality start-ups are assisted to start-up and grow (Natasha and Jameela 2014). According to Hackett and Dilts (2004b), available selection options of incubatees into the incubator include the prior employment experience and technical expertise of the entrepreneur or the venture team, the properties of the market the venture is aiming at, the properties of the product or service and the profit potential of the venture. In principle, these may be divided into two overall approaches: selection focused primarily on the idea and selection focused primarily on the entrepreneur or the team. Other researchers like Bergek and Norrman (2008) and Fernández-Nogueira et al. (2018) argue that in order to pursue an idea-focus approach, incubators. Managers must have access to deep knowledge in relevant technological fields in order to evaluate the viability of ideas. A study by Tibaingana (2020) also revealed that poor selection criteria of business start-ups is responsible for their poor growth and sustainability and such a situation can be resolved by coming up with clear selection criteria and using experienced staff to select appropriate business start-ups for incubation in the incubator. From the foregoing discussion, it can be hypothesised that:

H1a: Incubatee selection criteria has a significant and positive relationship with sustainability of start ups

3.5. Incubatee monitoring and sustainability of start ups

Studies by David-West et al. (2018) and Games et al. (2021) have reported that for start-ups to be sustainable there is need for professional management, which involves monitoring tenant businesses closely against their business plans, and ensuring that the incubator itself operates in a business-like fashion with the prospect of becoming financially self-sufficient. Similarly, Theodoraki (2020) found out that incubators that provide extensive monitoring and comprehensive business assistance along with adequate interaction with incubator management, are characterised by start-ups that are making profit which make such start-ups profitable and perform better than those who do not. According to Ayatse et al. (2017), selection criteria done by incubators should focus on three primary factors in carrying out screening activities. These include the market, management team and financial factors in that order. Ayatse et al. (2017) further mention that focusing on only one of the factors is counterproductive implying that a business incubator needs to evaluate the prospective incubatees using the factors together. In that way, the profitability of being sustainable is higher compared to when the factors are considered separately. A study by Akçomak (2010) argues that business incubators that have a clear selection, entry, and exit criteria lead to sustainability of start-ups. This study hypothesises that.

H1b: Incubatee monitoring has a significant and positive relationship with sustainability of start ups

3.6. Resources and business sustainability of start-ups

Daft (1983), defines resources as all assets, capabilities, organisational processes, attributes, information, knowledge, etc., controlled by the business that enable it to conceive of and implement strategies that improve its efficiency and effectiveness. Hackett and Dilts (2004b) advance

resource appropriateness and sufficiency by focusing on dimensions of resource availability, quality and utilisation. Hackett and Dilts (2008) reinforces the need to maintain the quality of the resources to ensure a continuously rewarding business operation cycle. Mcadam and Mcadam (2008) also confirm this when they say that any incubatee start-up needs to maintain high standards of resources at their disposal if they are to sustain their business objectives and goals. Barney (1991), posits that resources are categorised into physical capital resources, human capital resources, and organisational capital resources. Resources have a relationship on the quality of the incubatee start-ups inform of growth in turnover and financial performance. This is further confirmed by Harwit (2002) who points at the availability of venture capital for start-ups as a key success factor for start-ups. To ensure a continuously rewarding incubation process, it is likely that good incubation practice would include measures to maintain appropriate and sufficient amounts of resources at incubators. Consequently, the utilisation of such resources by incubatees results in value addition Mcadam and Mcadam (2008) hence success and sustainability of start-ups. Therefore, we can hypothesise that:

H1c: Resources and sustainability of start-ups are positively related.

4. Methodology

4.1. Design, population and sample

This study utilised cross-sectional and correlational research designs. The population comprised 152 incubatee start-ups operating from 8 incubators in Kampala (Uganda Entrepreneurial Ecosystem Initiative phase II report, 2018), out of which a sample size of 115 was determined using Krejcie and Morgan table (Krejcie & Morgan, 1970) as indicated in Table 2. A simple random sampling method was used to select the participants in this study. We received only 101 usable questionnaires (88% response rate), which were considered for analysis. The owner or manager filled the survey questionnaire. The respondents' profile (see Table 1) show that the majority of the participants were male (59 per cent, 60) aged between 25 and 29 years (57 per cent, 57). About (73 per cent, 73) of the respondents had Bachelors degree implying that the respondents were able to understand the contents of the questionnaire. In addition, majority of respondents were single (55 per cent, 55).

Table 1. Respondents' profile

Category	Scale	n = 101 (100%)
Gender	Male	60 (59%)
	Female	41 (41%)
Education	Certificate	1 (1%)
	Degree	73 (72%)
	Diploma	12 (12%)
	Masters	15 (15%)
Marital status	Divorced	3 (3%)
	Married	43 (43%)
	Single	55 (55%)
Age	18-24	8 (8%)
	25-29	58 (57%)
	30-34	28 (28%)
	35-39	3 (3%)
	40+	4 (4%)

Source: primary data

Table 2. Population and sample size

Business incubators	Population	Sample size
Uganda Industrial Research Institute (UIRI)	23	17
Makerere University Food and Technology Incubator	27	20
MUBS Entrepreneurship, Innovation and Incubation Center	7	5
The Innovation Village	26	22
Outbox	24	18
The Hive Colab	24	18
Kyambogo Business Incubation Centre	10	7
Tech buzz hub	11	8
Total	152	115

Source: Adopted and modified from Mutambi et al. (2010), Abaho and Nkambwe (2017) Uganda Entrepreneurial Ecosystem Initiative phase II report, 2018)

4.2. Measurement of variables and analysis of data

A closed-ended questionnaire was utilised to collect the data as opposed to an open-ended questionnaire. Our choice is based on the following reasons, as suggested by Sudman and Bradburn (1982). First, it allows for the computation of mean scores, which facilitate other statistical analyses. Second, there is less likelihood of researcher bias in summarising the responses. Last, it is easy to establish not only the direction of the responses but also the degree of intensity with which the views were held. The questionnaire was developed using items measure developed and tested by previous scholars (Altinay & Altinay, 2008; Hackett & Dilts, 2004a). Nonetheless, a few modifications were made to suit the study context. Sustainability of start-ups was measured using constructs of new product development, financial performance, Market entry, growth and independence (Altinay & Altinay, 2008). Resources were measured by two dimensions which included appropriateness and sufficiency (Hackett & Dilts, 2004a). Consistent with Hackett and Dilts (2004a), Incubatee Monitoring was measured by looking at the frequency of monitoring (time spent providing assistance to the incubatees, time spent by incubatees interacting with other incubatees) and comprehensiveness of monitoring (quality and scope of monitoring). Lastly, incubatee selection criteria was measured by looking at the owner's attributes, Intention to scale up, market characteristics, and product characteristics of start-ups (Hackett & Dilts, 2004a).

The indicator variables of sustainability of start-ups, resources, monitoring and incubatee selection criteria were anchored on a four point scale.

The collected data were edited, coded or categorised and processed using Statistical Package for Social Scientist (SPSS V21). Data screening was carried out to check for errors arising from incorrect data entry, out of range values, outliers, missing values and also normality (Field, 2005).

4.3. Validity and reliability of instruments

Content validity test was performed by administering 10 draft questionnaires to experts for validation and later computing the Content Validity Index (CVI). The questionnaire was then refined based on the comments from the experts. On the other hand, reliability of the instruments was ascertained using Cronbach's coefficient alpha to test for the internal consistency of the scales used to measure the variables (Chronbach, 1951). Alpha coefficient of above 0.7 for individual test variables was accepted (see Table 3) meaning the instrument was reliable (Nunnally, 1978). Furthermore, exploratory factor analysis was done to establish the convergent validity. The results show that the KMO values for the predictor and outcome variables are all above 0.5, which is acceptable, while Bartlett's

Table 3. CVI and Cronbach's alpha coefficient of study variable

Variables	Cronbach's Alpha	CVI number of items
Sustainability of start-ups	.825	.721 9
Incubatee selection criteria	.855	.833 8
Incubatee monitoring	.808	.796 7
Resources	.824	.881 8

Source: primary data

test of sphericity is also significant, with the significant value being 0.000 for each scale. The factor analysis results are presented in [Tables 4 and 7](#).

5. Results

5.1. Descriptive statistics

We performed descriptive statistics for item scales to ascertain how respondents understood them in relation to sustainability of start-ups. We generated means and standard deviations to summarise the observed data (see [Table 8](#)). We report the means and standard deviations because according to [Field \(2009\)](#), means represent a summary of the data, whereas standard deviations show how well the means represent the data. Because of small standard deviations relative to mean, the data and results represented in this paper represent the true reality.

5.2. Correlation analysis

We ran the Pearson moment correlation coefficients among the business incubation practices constructs and sustainability of start-ups. The results are in [Table 9](#).

Correlation analysis with all the domains showed positive and significant coefficients. Specifically, [Table 9](#) reveals that there is a significant positive relationship between incubatee selection criteria and sustainability of start-up firms ($r = 0.518, P < .01$). This means that a positive change in incubatee selection criteria will lead to a positive change in sustainability of start-up firms and therefore H1(a) is preliminarily supported. Results also indicate that there is a significant relationship between incubatee monitoring and sustainability of start-up firms ($r = 0.464, P < .01$). This means that a positive change in incubatee monitoring will lead to a positive change in sustainability of start-up firms and thus providing initial support for H1(b). Results further show a positive and significant relationship between resources and sustainability of start-ups ($r = 0.324, P < .01$); meaning that a positive change in resources will lead to a positive change in sustainability of start-ups. As it is for now, H1(c) is also preliminarily supported.

5.3. Regression analysis

Because correlation analysis results provide preliminary support for the hypotheses, we further run multiple linear regression analysis to confirm our study hypotheses and to establish the contribution of the independent variables to the dependent variable. Results are presented in [Table 10](#).

The results in [Table 10](#) indicate that of the three independent variables, two of them were found to have a significant positive effect on sustainability of start-up firms. That is; incubatee selection criteria ($\beta = .403, P < .01$) and incubatee monitoring practices ($\beta = .328, P < .01$). This result means that the level of sustainability of start-up firms in Uganda improves with the improvement in the appropriateness and effectiveness of the Incubatee selection criteria. Similarly advancement in incubatee monitoring leads to increasing the sustainability of start-up firms in Uganda. In terms of hypothesis testing, H1(a) and H1(b) are confirmed.

On the other hand, the resource aspect ($\beta = .072, P > .05$) was not found to have a significant effect on sustainability of start-up firms in Uganda. This seemingly contradicting result to the

Table 4. Rotated component matrix for sustainability of start-ups

	Growth	New product development	Independence	Financial performance
The company has expanded its market share despite being young in the industry	.792			
The company has opened up different branches to effectively serve its customers with ease	.719			
The company sales volume has tremendously increased despite the other business challenges	.701			
The company is able to develop products that respond to competition from other players		.843		
The company is able to develop new products with ease to suit the changing needs		.818		
The company is able to put in place any business support structures through its management structures independently			.843	
The company is independent from the incubator management and sponsors of the incubator			.838	
The company is able to raise finances from different sources before leaving the incubator				.831
The company has expanded its revenue streams through increased sales volume				.756
Eigen value	1.845	1.665	1.555	1.540
Variance (%)	20.501	18.504	17.277	17.110
Cummulative variance (%)	20.501	39.005	56.282	73.392

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. a. Rotation converged in seven iterations.

Source: primary data

Table 5. Rotated component matrix for incubatee selection criteria

	Market characteristics	Owners attributes	Product characteristics
The incubatees' potential of creating new markets is key prior to admission into the incubator	.869		
The size of target market determines whether an incubatee is admitted	.866		
The current market position is critically looked into by incubator management prior to admission	.684		
Networking and social skills are requisite attributes for all incubatees prior to admission		.871	
The entrepreneurial experience of the incubatee matters a lot prior to admission into the incubator		.857	
The previous work experience of the incubatee is always considered by the incubator management prior to admission		.612	
Uniqueness of Incubatees' products is regarded a key entry requirement into the incubator			.894
Imitability of product/ service/solution by the incubatee is always assessed before admission			.855
Eigen value	2.097	1.965	1.779
Variance (%)	26.207	24.567	22.238
Cummulative Variance (%)	26.207	50.774	73.012

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. a. Rotation converged in five iterations.

Source: primary data

correlation results could possibly be due to the existence of a mediating effect of either of incubatee selection criteria and incubatee monitoring on the relationship between resources and sustainability thus H1(c) is not supported.

The results in [Table 10](#) further shows that all the independent variables combined, that is; Incubatee selection criteria, Incubatee monitoring and resources predict 36.5% of the variation in sustainability (Adjusted R Square = .365). The regression model was also found to be well specified (F Statistic = 20.199, P < .01), meaning that at least one of the independent variables captured in the model is a suitable predictor of sustainability.

Table 6. Rotated component matrix for incubatee monitoring

	Comprehensiveness and quality	Frequency of monitoring
The incubator regularly reviews its services to ensure quality services to start-ups	.760	
The incubator manager actively seeks ways to continuously improve the level of customer service satisfaction inside the incubator	.758	
The incubator management regularly monitors production, administrative, technical and operations progress of the incubatee	.742	
The incubator management uses participatory approaches to validate the quality of strategic service providers such as mentors and trainers so as to remain relevant to the needs of the incubatees	.624	
The incubator allows adequate time to the incubatee in terms of assistance		.837
Frequent interactions between incubatees and incubator management reduce the likelihood of company making expensive business mistakes		.687
Incubatees are allowed appropriate amount of time interacting with other incubatees for feedback and different forms of advice		.561
Eigen value	2.242	1.751
Variance (%)	32.022	25.012
Cumulative variance (%)	32.022	57.033

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. a. Rotation converged in three iterations.

Source: primary data

6. Discussion

According to the present results, incubatee selection criteria and incubatee monitoring practices are significant predictors of sustainability of start-ups. This implies that better market characteristics, product characteristics and the owners Attributes correspond with high levels of sustainability. In addition, results imply that the level of sustainability of start-up firms in Uganda is directly associated with the level of incubatee monitoring in regard to comprehensiveness and quality as well as frequency of monitoring. Regression results further indicate that resources were not found to have a significant effect on sustainability of start-up firms in Uganda. This means that having sufficient and appropriate resources could not simply predict that a start-up will be sustainable. Our findings are in agreement with studies conducted by previous scholars for example, a study by Tibaingana (2020) found out that good selection criteria of business start-ups is responsible for their continuous growth and sustainability. Tibaingana (2020) further explained that with clear selection criteria and using experienced staff to select appropriate business start-ups for incubation in the incubator, sustainability of such start-ups is obvious. Similarly, Bergek and Norrman (2008) and Fernández-Nogueira et al. (2018) found out that in order to pursue an idea-focus approach, incubator managers must have access to deep knowledge in relevant technological fields in

Table 7. Rotated component matrix for resources

	Resource appropriateness	Resource sufficiency
There is provision of tailored business-related information from the incubator in a way that is easy to understand	.877	
Incubatees are offered standard tailored flexible agreements to meet their changing business needs by the incubator	.826	
Incubatees receive specific advice obtained from the incubator arrangements and programs	.792	
There is provision of managerial support to incubatees in form of grant management	.741	
Incubatees have access to adequate intellectual property advice from experts		.791
Incubatees have full access to professional support such as, accountants, lawyers and others that may be necessary for the improvement of the business		.728
Incubatees have access to enough technology labs		.721
Information on sources of capital from the incubator is always readily available to incubates		.541
Eigen value	2.766	2.088
Variance (%)	34.570	26.106
Cumulative variance (%)	34.570	60.676

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. a. Rotation converged in three iterations.

Source: primary data

order to evaluate the viability of ideas. Isabelle (2013) also posits that selection policies of the incubator have an effect on the survival of the incubatees during incubation and even after graduation from the incubator. Furthermore, the results concur with findings by Kavhumbura (2014) who investigated the critical success factors for business incubation in South Africa and found out that a stringent selection criteria was positively correlated to the performance of incubatee start-ups.

Table 8. Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Standard deviation
Incubatee selection criteria	101	1	4	3.78	0.274
Incubatee monitoring practices	101	1	4	3.77	0.391
Resource	101	1	4	3.56	0.232

Source: Primary data

Table 9. Correlation results

	1	2	3	4
Incubatee selection criteria (1)	1			
Incubatee monitoring practices (2)	.275**	1		
Resources (3)	.349**	.340**	1	
Sustainability of start-ups (4)	.518**	.464**	.324**	1

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

* Correlation is significant at the 0.05 level (two-tailed).

This study also revealed that incubatee monitoring and sustainability of start-ups in Uganda are positively related. Such study is in agreement with scholars like David-West et al. (2018), Hackett and Dilts (2004a), Peters et al. (2004), and Games et al. (2021). For instance, our study concurs with David-West et al. (2018) who reported that for start-ups to be sustainable there is need for professional management, which involves monitoring tenant businesses closely against their business plans, and ensuring that the incubator itself operates in a business-like fashion with the prospect of becoming financially self-sufficient. Moreover Theodoraki (2020) found out that incubators that provide extensive monitoring and comprehensive business assistance along with adequate interaction with incubator management, are characterized by start-ups that are making profit which make such start-ups profitable and perform better than those who do not. McAdam and Marlow (2009) also supported this argument from a social-capital perspective that more frequent counselling interactions enable the creation of stronger ties that facilitate transfer of knowledge and learning between the incubator management and the incubatee start-ups. This is greatly supported by the findings in this particular study where the frequency of monitoring appeared to contribute to the positive relationship between incubatee monitoring and sustainability of start-ups.

Whereas the correlation results revealed a significant and positive relationship between resources and sustainability of start-ups, the regression analysis findings later revealed that resources were not found to have a significant effect on sustainability of incubatee start-up firms. The results are found to be in total disagreement with different scholars such as Hoopes et al. (2003) who argued that that appropriate resources such as administrative support services, sources of capital, access to lawyer, accountants, consultants, marketing specialists and funding contacts are critical for the success of a vulnerable incubatee start-

Table 10. Multiple linear regression analysis of sustainability of start-up firms

	Unstandardised coefficients		Standardised coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	.701	.261		2.683	.009
Incubatee selection criteria	.314	.067	.403	4.666	.000
Incubatee monitoring practices	.312	.082	.328	3.815	.000
Resources	.059	.073	.072	.813	.418

R² = 0.385; Adjusted R² = 0.365; F Statistic = 20.199.

ups. The findings also disagree with Hackett and Dilts (2004b) who found out in his study that resource appropriateness and sufficiency underlined by resource availability, quality and utilisation can guarantee sustainability of start-ups. This seemingly contradicting finding could possibly be due to the existence of a mediating effect of either of incubatee selection criteria and incubatee monitoring on the relationship between resources and sustainability.

7. Conclusion and implications

This study aimed to establish the contribution of business incubation practices (incubatee monitoring, incubatee selection criteria and resources) on sustainability of start-ups in Uganda. This was achieved through a questionnaire survey of 110 incubatee start-up firms. Results suggest that incubatee monitoring, incubatee selection criteria and resources are significant predictors of sustainability. Results further show that incubatee selection criteria, incubatee monitoring and resources predict 36.5% of the variation in sustainability.

Overall, the findings of this study have important implications for academics as well as practitioners and regulators. For academicians, the results have indicated that business incubation practices have a significant and positive impact on sustainability of incubatee start-ups. This implies that focusing on incubatee selection criteria, incubatee monitoring and resources create value on the side of the incubatees and to the incubation process which in turn leads to sustainability of start-ups. For the government, there is a need for business incubators in Uganda to come up with a thorough incubatee selection criteria that is enforceable in order to minimise the mortality rate of incubatee start-up firms. This criteria should emphasise the key aspects of market characteristics, owners' attributes and product characteristics. Once these are given attention prior to admission of any incubatee start-up firm into the incubator, it will reduce the likelihood of failure and increase chances of success. For policy makers, incubatee monitoring practices should be regularly reviewed by policy makers to ensure that they are of good quality and comprehensive enough to detect the needs and challenges of incubatees on the incubation program. This will go a long way in ensuring that all incubatees stay focused and have the ability to evaluate their progress early enough and make sound decisions regarding either to continue on the incubation program or withdraw from it for purposes of guaranteeing sustainability of their businesses. Whereas resources are of great importance towards sustainability of the incubatee start-up firm, it is not just about mobilising these resources but sufficiency and appropriateness of the resources that may be provided must be put into consideration for purposes of ensuring sustainability. Resources availability and appropriateness enables proper planning and managing of the enterprises and as such any start up that succeeds at utilisation of resources stands chances of sustaining its operations.

8. Limitations of the study

The contributions of this study should be interpreted with respect to the following Limitations. First, the study focused on only three business incubation practices in predicting sustainability of start-ups in Uganda. These predict only 36.5% of the variation in sustainability implying that there are other predictors of sustainability of start-ups. Future research could explore other determinants of sustainability of start-ups both in Uganda and outside Uganda. Second, this study was cross sectional in nature, which measures the intention only at a single point in time. Thus, the study does not provide findings over a long period of time. Additionally, The study used a self-administered questionnaire with close-ended questions and this limited the amount of data to be collected because it did not give room for the respondents to supplement any information and in case of any misinterpretation, it went unnoticed. We however, contend that the findings of this study bear credence and will provide key insights for entrepreneurs, policy makers and scholars.

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Areas of further research

Future research could explore other business incubation practices and how they could influence sustainability of start-ups both in Uganda and outside Uganda. A longitudinal study could further be carried out to investigate how various business incubation practices influence sustainability of start-ups. Nonetheless, this study provides initial empirical evidence on the contribution of incubatee selection criteria, Incubatee monitoring and resources.

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