VENTURE CAPITAL FINANCING AND FINANCIAL PERFORMANCE OF TECHNOLOGY START-UP FIRMS IN KENYA

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ABSTRACT

Technology start-up firms perform an essential part in boosting innovation and job creation in any economy. Africa is seeing a growing number of technology-based start-up firms helping improve sectors such as financial technology, agriculture, e-health, transport and education. However, access to financing remains a major challenge for technology-based startup firms as formal financial institutions are afraid to provide financing, especially to early-stage startups. The purpose of this study was to identify the relationship between venture capital financing and the financial performance of Kenyan technology start-ups. The specific objective of this study were to identify the relationship between equity financing, conditional loans, convertible debentures and the financial performance of Kenyan technology start-up firms. The study used interest rates as the mitigating effect. This study was based on three main theories. Resource-Based Theory, Psychological Theory of Entrepreneurship, Economic Theory of Entrepreneurship. The study will incorporate descriptive research. The survey conducted on technology-based start-up firms operating in Kenya. The study sampled 129 of 191 registered venture capital-funded Kenyan technology start-up firms over a six-year period from 2016 to 2022. The selected 129 technology start-up firms were sampled using stratified random sampling. This study primarily used secondary data from reports, financial statements and publications issued by the target incubation centers. This approach was considered to avoid the difficulty of obtaining information as most start-up firms keep their financial information highly confidential. Statistical packages for Social Sciences was used to support the analysis, as tabular reports, graphs, and trend charts can be created from the software. This study used linear regression analysis to determine the impact of venture capital on the financial performance of technology start-up firms. Normality, multicollinearity, and autocorrelation tests will be performed to assess the distribution and collinearity of the regression model. Data was displayed as charts, graphs, and pie charts. The study was able to access information from 107 technology start-up firms which represent 85% response rate. The variables considered for the study were able to explicate 38.7% of variation on financial performance. The research observed that there was an inversely relationship between equity financing and financial performance of technology start-up firms in Kenya. The research further showed that an increase in factors such as good repayment terms, Interest rates borrowing requirements increases the financial performance of technology start-up firms in Kenya. Financial performance of technology start-up firms was found to be directly affected by, long-term goals of the firm, Need for control and Ratio of conversion. The study further determined a positive correlation between venture capital financing and the financial performance of technology start-up firms in Kenya.

Key words: Venture capital financing, Financial performance and Technology start-up firms

INTRODUCTION

It is believed that technology plays a critical role in spurring economic growth. This has seen an upsurge in innovative technologies in the recent past across the globe with emerging economies increasingly investing on technological innovation creating an increase of technology based start-up firms. Start-up companies are business ventures that are founded on novel and disruptive ideas in order to find a robust and expandable business model. (Karema, 2015). Technology-based start-up firms have become an effective mechanism not only for the absorption of foreign technology in developing countries, but also for the creation of local technology (Comin & Mestieri, 2014). According to the World Bank (2017), technology-focused entrepreneurs are booming in both developing and developed countries. These technology-based startup firms can be used to launch, test, and validate companies much more quickly than traditional companies, making them attractive investments for early-stage investors.

Globally, the start-up economy remains large, generating value of nearly USD 3 Trillion. 7 of the top 10 largest companies worldwide were in the technology sector, seeing the year 2019 close with around USD 300 Billion in venture capital investment around the world. In private markets, funding across seed, early-stage and late-stage venture capital grew in dollar value across the last five years (2016-2020), closing 2020 at over USD 300 billion, a 60% increase from around USD 180 billion in 2016 (Global Start-up Ecosystem Report, 2020).

On the continental front, as the innovation culture continues to take root, more and more technology entrepreneurs continue to emerge. As the number of technology start-up firms increases, so does the investment in technology. Start-up firms in the sectors of Fintech hh, Education, Agriculture, Transport, Energy, Healthcare and Water received the most investment taking 93.2% of $1.1 Billion investment made in Africa in the last quarter of 2019 (Kenyan wall street, 2020). The pace of deal making on the continent gained momentum as well over the years with the number of VC deals growing from 96 in 2016 to reach an all-time high of 319 in 2020 (AVCA, 2021). On the regional front, Kenya continues to assert its claim as the hub for start-up and investment. Of the USD 62.15 million raised in the East Africa region in 2020, Kenya attracted USD 50.7 million (Briter Bridges, 2021).

Over the recent past, Kenya has set itself as one of Africa's technological innovation hubs drawing the attention of innovators across the world. Having established itself as one of the top four start-up destinations, Kenyan start-up firms raised record amounts of funding in 2020, raising a total of US$191,381,000. They account for 27.3 % of the total investment made in the continent, a figure instigated by a growth of funded start-up firms from 45 to 59 – a 31.1% growth. (Disrupt Africa, 2020)

When it comes to funding, 3 main sources of financing exist for tech start-up firms and innovators; Owner financing, equity financing and debt financing. As in most economies, bank loans as a form of debt financing or equity brokered through the public equity market is generally only available to established firms. The early and expansion phases of a start-up's life cycle, when the business model is unproven, are particularly difficult financially. Start-ups, technology-backed ones included, aim

to transform entire industries through the creation of novel goods, services, and manufacturing techniques. Access to early-stage corporate financing and later growth capital is typically crucial for their survival. (WIPO, 2020)

According to VC4A report (2018) the success of businesses and the help they get from Kenya's startup ecosystem are clearly related to one another. As an illustration, 50% of businesses taking part in ecosystem support programs secure their financing. Even more intriguing is the almost 6x increment in the average investment in guarantees for companies supported by the ecosystem. $191,000 vs. $34,000.

Venture Capital Financing

Venture capital financing would be best described as investment made in an early stage start-up in exchange for equity. Venture capital financing refers to qualified financial mediation lending to companies with the aim of obtaining capital gains by going public or acquiring in the near future. (Dessi & Nina, 2015). According to Harvard Business Review (1998) the Venture capital niche exists based on the structure of the capital markets where individuals with new ideas or technologies often lack access to funds to actualize the ideas or technologies due to the perceived risks. There are 3 distinct methods by which venture capitalists and other investors finance enterprises; equity financing, conditional loans and participating debentures.

Equity financing refers to the process of raising capital by giving up a stake of the company. This is done by converting money from various investors into the company's shares. Aside from debt, equity financing is a critical part of the company's capital structure. Organizations are increasingly recognizing and using equity to finance investment projects since compared to debt financing, equity financing is less risky. (Noor & Simiyu, 2020). In most cases equity financing for early stage technology based startups is sourced from Angel Investors. Angel investors are often referred to as affluent individuals who invest their private funds in start-up companies in exchange for stake in the company. According to Karema (2015), Angel investments are made for investors to earn a return on capital, participate in the entrepreneurial process, and often give back to the community by facilitating economic progress. Investors allow business owners to effectively expand their business and get a return on investment by exiting the business mainly in the mid-term and often between potential failures and take-off.

Conditional loans are loans that neither carry a fixed interest rate nor have a pre-determined repayment schedule and are regularly repayable as royalties after the business makes revenue. According to Fateine (2020), with the lender not obligated to pay interest on the loan amount, the royalty rate can range from 2% to 15% depending on the venture's revenue, profit margins and cash flow. Contrary to traditional loans, where principal and interest are paid back according to a set timetable regardless of profit or loss, conditional loans do not require immediate repayment of interest or principal.

Convertible debentures are usually unsecured bonds/loans that that are middle to long-term in nature that are usually converted to stock or equity at a determined future. Convertible debentures are

typically governed by two main provisions; Interest and Maturity. Interest is usually accrued as the venture grows and therefore the value of the initial investment grows. The maturity of the convertible loan is determined at the initial investment period. At the end of such period, the loans are payable to the investor if they are not already converted. Convertible bonds, which can be converted into shares of the issuer's stock, have some probability of remaining bonds and some probability of being converted into stock. Although, on the face of it, these bonds seem to be part debt and part equity, under current accounting rules, convertibles are counted entirely as debt until converted or paid off (Arak & Martin, 2015). When raising capital by use of convertible debentures it is important for a start-up to factor in how the equity to debt ratio would be affected by the conversion of the debentures.

Funds are usually disbursed in either of 3 disbursement approaches being upfront financing, staged financing and syndicated financing. In upfront financing, the investor contributes the agreed full amount at the start of the project, while in phased financing, refinancing is dependent on investor valuation. In other words, the project will only proceed if the startup reports high profitability for the project (Shin & Yun, 2014). In syndicated financing, 2 or multiple venture capital firms join to go in for equity in an interest (Wright & Lockett, 2002).

Despite the global pandemic and economic uncertainty, Venture Capital investments in Africa continue to maintain an upward trajectory growing by over 400% in the past 7 years (2015-2021) (Disrupt Africa, 2020). In the year 2020, 397 start-up firms in Africa raised US$701,460,565 in total funding. During that period, Kenyan start-up firms raised a record amount of funding, securing a combined total of US$191,381,000 which accounted for 27.3% of all funding made in the continent. (Disrupt Africa, 2020).

Financial Performance of Technology Firms

Businesses develop through a step-by-step process. Investigating how venture capital investment might assist start-up firms in maintaining sustainability and achieving improved performance requires an understanding of the growth stages of these businesses (Jeong, Shin, Kim & Kim, 2020). Financial performance of the start-up can be assessed throughout the growth process. As any enterprise grows, it is important for a start-up to be able to evaluate its growth. A start-up therefore needs to establish appropriate measurement systems to constantly evaluate its financial and non-financial performance.

A start-up company may evaluate return on invested capital, earnings before interest and taxes, net asset value, return on equity, operating income, etc. to properly gauge financial performance. (Lunardi, Becker, Macada, & Dolci, 2014). Most financial institutions' performance is typically gauged by their ability to be profitable, which can be done by looking at metrics like return on capital used, return on equity, or return on assets. While return on assets evaluates the farm's capacity to use its effect to make profits, return on equity reflects the firm's ability to benefit from the owner's investments (Rosenberg, 2009). The profitability and efficiency of a company's capital investments is measured by a metric referred to Return on Capital Employed (ROCE). The ROCE ratio shows if a firm is generating adequate profits and revenues to optimally utilize its capital assets

(Singh & Yadav, 2013). However, it was also noted that as competition intensified and information became more available, traditional financial KPIs were perceived as inadequate, and non-financial KPIs became an increasingly valuable new source of information. (Fisher, 1992). Such non-financial performance measures could be taken to include market share and innovation.

Technology Start-up Firms

According to Kiprotich (2017), the principle of Start-up firms is aligned to the notion of improvement and advancement. Start-up firms are fledgling businesses that are starting their operations. The Kenya start-up act of 2020, describes start-up firms are to be registered companies and should be less than seven years old. It is estimated by Olawale and Garwe (2010) that start-up firms attribute to for approximately 35% of urban jobs. In Kenya, there are more than 1333 registered start-up firms. These technology star-ups are incubated in the 50 innovation hubs spread all over the country (VC4A, 2018). Of this registered technology based start-up firms, 191 have received VC funding according to Disrupt Africa (2020)

In an industry overview, fintech and e-commerce are the top two sectors for the number of funded start-ups, followed by e-health, logistics, energy and agritech sectors. Kenya has a vibrant community of entrepreneurs working in a variety of industries, with truly innovative solutions emerging from the country on a regular basis. However, the site is somewhat biased when it comes to fundraising. Investors are drawn to Kenya's opportunities and are ready to back solid, proven companies operating in the region. Therefore, there are always large rounds in Kenya with several international venture capital firms and institutions working together to make the right investments. (Disrupt Africa, 2020).

Kenyan start-up firms are consistently among the continent's leaders in attracting investment. This is supported by good web connection, fast internet, and the country's lead in the East African economy. This has resulted in increased investment in the country, which has fueled the start-up sector. This growth was further catalyzed by the laying fibre-optic cables on the coast around the year 2010. Start-up firms have enticed brilliant individuals from across the continent and beyond, facilitating Nairobi's growth into the startup ecosystem it is today. (GIZ, 2019)

Technology Start-up Firms in Kenya

Kenya's technology start-up environment has seen a stable incline in the last 10 years. It is estimated that Kenya's ICT sector, that anchors technology-based start-up firms, has grown at an annual rate of 11.8% since 2016. (AfricaTech, 2021). This has led to it being regarded as the "epicenter of innovation' in Africa and has taken up the moniker 'silicon savannah' (Moime, 2016). This growth has attracted the attention of investors with technology start-up firms attracting USD 191,381,000 in 2020 a 1,829% increase from USD 10,464,200 funding in 2016.

One of the biggest challenges technology start-up firms face has been financing, with conventional financial institutions shying away from financing due to a high perception of risk. This has created a gap for alternative financing such as venture capital financing. Most of this financing is done

through accelerator programs run by incubation hubs with investors funding start-up firms at various stages. Ticket sizes are extensive ranging from a few thousand dollars to USD 25,000 with an average deal size of USD13,000 for idea stage and USD 18,000 for prototype stage (Karema, 2015). According to the AfricArena Report (2021), Kenya's start-up firms attracted USD 305,000,000 for 52 deals in 2020, averaging a deal size of USD 5,900,000 per deal. This was however a 46% decline attributed to the COVID-19 pandemic. In perspective, venture capital investment into Kenya as a proportion of GDP remains highest at 0.32%, above the ratio for Asia (0.27%) and Europe (0.16%), indicating an investment higher than the norm in technology start-up firms through VC.

Statement of the Problem

Kenyan start-up companies continue to be major players in economic development as they create employment opportunities and promote youth participation in growth of the economy and at the same time encouraging education and use of inventive tools. Note that over 50% of Kenyan technology start-up firms will probably go insolvent within the initial five years due to lack of market, poor management and financial constraints. Most technology start-ups have poor business cash flow and working capital management, contributing to their inflated failure rates. This may be why access to funding for start-ups remains a major hurdle (Ekanem, 2010)

Inadequate financing remains an obstruction to the progression of Kenyan start-up firms (Wanjohi & Mugure, 2010). Since they are considered risky, (Memba, 2011) notes that start-up firms face discrimination from the financial institutions especially banks. Most financial institutions are reluctant to extend lending to start-ups due to high administrative costs, increased information asymmetry, high risk perception and lack of collateral associated with small scale lending. (Mugo, 2020). Lack of access to financing has therefore led start-up firms seeking alternative ways to finance their enterprises.

Many start-up firms in early stage and expansion stage have to rely on self-financing for their ventures. There are however, a growing number of equity investment opportunities for start-up innovators that provide a wide range of liberties for start-up firms. A high numbers of venture Capitals and Business Angels do exist in the country, indicating this as an area for future growth. Investment in venture capital is essential because emerging businesses frequently lack the concrete resources—such as past experience and knowledge—and intangible resources—such as financial resources—essential for business growth. Nonetheless, a lesser proportion of new businesses successfully secure venture capital financing, with the timelines associated with getting investments varying across the development stages of start-up firms (GIZ, 2019). Venture capital costs have been mentioned as an influence in the limited advancement of venture capital backed start-up firms (Macdonald, 2015), and numerous research has investigated the risk analysis of venture capital funding in Kenya

A study by Jeong, Shin, Kim and Kim (2020) showed that the earlier a start-up firm receives an investment offer from a venture capital company, the better the start-up firm will perform. This suggests that early stage venture capital investment will lead to sustainable growth. Start-up firms that have received external funding often demonstrate their growth potential through IPOs, and are

projected to continue growing after IPOs. Though the study adequately elaborates the positive impact venture capital financing has on initial stages of technology start-up firms, it only shows potential for success on the initial stages and does not carry through the development stages thus a conceptual gap.

In spite of widespread academic studies, the influence of venture capital funding on business performance remains imprecise, and earlier studies on the subject have displayed varied outcomes. From this perspective, this research targets to scrutinize the influence of venture investment funding on the overall financial performance of start-up companies.

Objectives of the Study

To determine the correlation between venture capital financing to the financial performance of technology start-up firms in Kenya.

Research Questions

This research tested the following null hypotheses:

H_{01}: Equity offered by venture capitalists does not have a significant effect on the financial performance of technology start-up firms in Kenya

H_{02}: Conditional loans offered by venture capitalist do not have a significant effect the financial performance of technology start-up firms in Kenya

H_{03}: Convertible debentures do not significant influence the financial performance of technology start-up firms in Kenya

LITERATURE REVIEW

Theoretical Framework

This study is based on three theories, the theories were; resource-based theory, psychological theory of entrepreneurship and economic theory of entrepreneurship.

Resource-Based Theory

Barney (1991) developed resource-based theory is focused on the advantages of homogeneity in resources to maintain competitive advantage. The theory according to Barney (2000), focuses on three key components; firm resources, competitive advantage, and sustained competitive advantage. The model contends that firm resources that are valuable, uncommon, difficult to duplicate, and irreplaceable fixed resources are the bases of long-term competitive advantage.

Petefar and Barney (2003) posit that resource-based theories are more interested in a firm's capabilities and resources that allow it to perform tasks that add value beyond what is provided by competitors' firms, giving it a competitive advantage. Other significant resource-based theories attempt to explain how to sustain competitive advantage and profitability through time include Rumet (1984), Barney (1991) and Amit and Schoemaker (1993). Theorists such as Dierickx and

Cool (1989) address the processes companies use to create and integrate capabilities and resources within their companies. On the other hand, theories such as Dollinger (1999) explains how entrepreneurs found enterprises out of the resources and skills they have at the moment or those that can be owned or acquired.

In trying to further expand the boundaries of resource based theories, Alvarez and Busenitz (2001), attempting to understand the combining and structuring of resources as a resource. This lines up with Schumpeter (1934) who hypothesizes that new avenues of competition are derived from new combinations of resources, and these new avenues of competition come from new firms developing alongside existing firms. Kenyan technology based start-up firms seem to be keen to leverage on combination of resources when financing innovations, some seeking multiple financing routes, with those that manage to pull most funds having the ability to stay competitive. This theory gives credibility to convertible debenture discussion as it shows how a combination of a 'hybrid' financing gives a firm competitive edge.

Psychological Theory of Entrepreneurship

The Psychological theory of entrepreneurship, as put forward by David McClealand first in the early 1940s, focuses on behavioural motivations of entrepreneurs. According to McCelland (1961), a burning desire of need for achievement is essential for an entrepreneur to engage in entrepreneurial activities. It is even more pronounced when it comes to entrepreneurs that are seeking to create new ventures as is expressed by Shaver and Scott (1991). McClelland further categorized the characteristics of an entrepreneur as having 2 features; doing new things in new and better ways and making decisions under uncertainty.

The two major behavioural traits are, need for control and need for achievement (Landstrom, Manigart, Mason, & Sapienza, 1998). Other additional personal traits that have been seen to be oriented to psychological entrepreneurship views include risk taking, innovativeness and tolerance for ambiguity (Kwabena, 2011). High achievement individuals set challenging goals under unforeseen circumstances and consciously take risks to achieve those goals. Therefore they look for innovative ways to solve these problems. Maslow (1965) theorizes that, a society where the need for achievement is generally high produces more energetic entrepreneurs, which in turn leads to faster economic development. The need for success is therefore key to the success of small business owners (McClelland & Burnham, 1976)

The locus of control is a personality trait that has its influence in entrepreneurship. Rotter (1954) theorizes that Entrepreneurial individuals typically assume that they have internal control over a problem or that external control rests with others or the environment. Furthermore, Rotter (1966) asserts that the locus of control is measured by the extent to which an individual perceives reinforcement as being either under their control (internal locus) or as a result of chance, luck, or other strong influences (external locus).

Robbins, Judge, states Odendaal and Roodt (2009) however does posit a varying theory that self-motivated individuals are externally motivated by challenging goals that enables them to

accomplish tasks efficiently. Robbins further criticized the McClelland's theory arguing that it less practical than most theories as the theory terms the motivations as subconscious thus making it difficult to measurable.

Individuals willing to venture into entrepreneurship have a high motivation for achievement, are moderate risk takers, have a greater innovative propensity and ability, and have an internal rather than an external locus of control (Carland, Hoy, & Boulton, 1984). Peterson and Luthans (2006) also posit that entrepreneurs with an internal locus of control often positively face obstacles, seeking constructive solutions (innovation) to solve problems. Venture capital and other financing institutions are therefore developing models that seek Technology based start-up firms that led by highly motivated individuals and therefore seek those that are beyond the idea stage. By discussing risk, this theory therefore helps understand the reasons for debt financing choice made by Technology start-up firms.

Economic Theory of Entrepreneurship

The Theory Economic Development Theory, (Schumpeter, 1912), outlines the concepts of innovation and entrepreneurship. The theory explains how entrepreneurship and innovation, or "new combinations," contribute to economic progress. According to this rationale, entrepreneurial opportunities and activities create entirely new opportunities for investment, employment, and growth by utilizing the discoveries made by inventors and scientists. (Śledzik, 2013). The Schumpeter theory draws from the earlier Cantillion (1755) who described entrepreneurs as bearers of risk who purchase at assured prices and go on to sell at uncertain prices. Therefore anyone that receives uncertain income could be regarded as entrepreneur or participating in entrepreneurship. Multiple theories and studies have helped to further understanding in the concept of entrepreneurship and elaborate on its economic influence, describing its key entrepreneurial constituents. The term "entrepreneurship" can also refer to the entrepreneurial component, the entrepreneurial role, the entrepreneurial effort, the entrepreneurial behavior, or even the entrepreneurial psyche. (Kiprotich, 2017). The entrepreneur function can be defined as: Discovering, evaluating and exploiting opportunities such as new processes, products or services. For goods and inputs that did not previously exist, new organizational forms exist, as do new markets. (Shane & Venkataraman, 2000).

Entrepreneurial behavior is seen as a successful combination of innovation, risk-taking and proactive behavior (Miller, 1983). Simply put, Schumpeter's combination of classic theories of innovative entrepreneurship (1934, 1942) and Frank (1921) who views the world as an environment that brings new opportunities for businesses to form and make profit. The presence of economic incentives influences the motivation for entrepreneurship. In this case, it is appropriate to think of economic incentives as having access to information about fiscal and industrial policy, infrastructure availability, sources of funding and raw materials, investment and commercialization opportunities, technology and market conditions. (Papanek, 1962; Harris & Todaro, 1970).

There have been critiques to the Schumpeter theory, one being Moldaschl (2010) who argues that Schumpeter's interpretation that innovation only refers to commercially exploitable novelty, fails

to consider differences in innovation and imitation and ignores social innovation as a concept within entrepreneurship. Technology based start-up firms in Kenya are mostly started by youth with the key motivation to commercialize solutions. Even with a lack of adequate financial literacy, most youth are eager to cede ownership of their innovative enterprises so as to commercialize. This theory offers an insight into how innovators could better understand equity financing and its impacts on the financial performance of technology based start-ups.

RESEARCH METHODOLOGY

Research Design

A study design is a research plan or framework that guides collection and analysis of data. According to Gill and Johnson (1997), a study design is a roadmap that directs the conduct of study and serves as a guide to its completion.

This research includes a descriptive study. Descriptive design is an approach of collecting information in response to questions about the status of research topics (Mugenda & Mugenda, 1999). According to Cooper and Schindler (2003), descriptive design identifies and quantifies the cause and effect of interactions between variables. This research chose a descriptive design since it allows for collection of considerable amount of detailed data about the studied population and allows the results to be generalized to larger groups.

Target Population

The population element is regarded as the subject upon which the analysis is made and is the study unit (Cooper & Schindler, 2003). The study looked at 191start-up firms that had been financed by venture capitalists and private equity funds as the target population (Disrupt Africa, 2020)

Table 5.1: Population by Sector

Sector	Percentage	Size
Energy	21.4	41
AgriTech	18.7	36
Logistics	14.3	27
E-Commerce	12.4	24
Fintech hh	8.5	16
Others	24.7	47
Total	**100**	**191**

Source: Author (2023)

Sampling Design and Sample Size

Sampling Design

This study adopted a stratified sampling technique as it reduces sampling error by providing a greater level of representation. The study stratified the key sectors of the population in order to get representation from each sector.

Sample Size

The sample selected to signify the population was guided by the following Yamane equation according to Mugenda and Mugenda (2010);

$$n = \frac{N}{1+N\,(e)2}$$

Where; n = Sample size, N = Population size and e = confidence level (0.05)

$$n = \frac{191}{1+191\,(0.05)2} \qquad n = 129.27\ (129)$$

Table 5.2: Sample Size distribution by Sector

Sector	Population	Sample Size
Energy	41	28
AgriTech	36	24
Logistics	27	18
E-Commerce	24	16
Fintech hh	16	11
Others	47	32
Total	**191**	**129**

Source: Author (2023)

Data Collection Instruments

This research utilized secondary data. Secondary data was gathered from published funding reports, financial statements and publications mostly from incubation hubs and start-up accelerators. Some of the technology start-up firms are included (see appendix IV). The data in focus was that of the last 6 years between 2016 and 2021. The research relied on the data collection schedule (see appendix III) to collect data.

Data Collection Procedures

This research begun by obtaining the requisite permit documents. The initial document being a letter from Kenyatta University that should facilitated acquisition of a research permit from the National

Council of Science, Technology and Innovation (NACOSTI) by the researcher. Due to the ravages of COVID-19, access to information was difficult as many organisations shifted their mode of work. However, more organisations have adopted more digital approaches this allowed the researcher to access information faster. The researcher then developed a list of technology incubation hubs from which information was drawn. Researcher then developed some key guiding questions to aid in creating a focus area. The researcher then selected a dataset from which information was derived. The researcher allocated a specific timeline and timetable for the research purposes.

Diagnostic Tests

Normality

A normality test was used at the initial stage to determine whether errors between the survey's dependent and independent variables fall below normal distribution of the selected regression model. The study utilized the Shapiro-Wilk normality test as it is most powerful for sample sizes above 100. The level of significance was set at 0.05.

Multicollinearity

Multicollinearity occurs in the event where a connection among independent variables in a regression model, this could cause a forecast error. This study carried out multicollinearity testing for where a high Variance Inflation Factor (VIF) of >10 shows a multicollinearity problem.

Autocorrelation

Autocorrelation relates time series data relating to the degree of correlation between values of a variable across different times. To check for autocorrelation, the Durbin-Watson test was used in the study. Values range from 0 to 4; value of 2.0 shows no autocorrelation, 0 to <2 indicate positive correlation and >2 to 4 indicates negative correlation.

Data Analysis and Presentation

Data collected was scrutinized in SPSS. A linear regression model was used to establish the correlation between the dependent and independent variables. This study used regression models as described by Hayes (2017)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:

Y = Return on Capital Employed (ROCE)

X_1 = VC Equity financing

X_2 = VC Conditional loan

X_3 = VC Convertible debenture

$\beta_1, \beta_2, \beta_3$ are coefficients

β = constant

ε = error term

Operationalization of Study Variables

Table 5.3: Operationalization of Study Variables

Variable	Category	Operationalization	Measurement
Financial Performance	Dependent variable	EBIT/ Capital Employed (total assets – current liabilities)	Ratio
Equity Financing	Independent variable	Venture capital investment amounts accrued and frequency	Interval
Conditional loans	Independent variable	Amount of loans and payment period	Interval
Convertible Debentures	Independent variable	Conversion ratio of debentures to equity	Interval

Source: Author (2023)

DATA ANALYSIS AND PRESENTATION

Response Rate

The research population included 126 technology startup firms in Kenya. However, complete data was only available from 107 technology start-up firms, representing an 85% response percentage. Mugenda and Mugenda (2013) posits, rate of response of above 50% is sufficient and can be reliably used for data analysis to reflect the characteristics of the population

Descriptive Characteristics

Table 6.1 below shows the summary descriptive statistics of the study variables.

Table 6.1 Descriptive Characteristics

	NO.	MINIMUM	MAXIMUM	MEAN	ST. DEVIATION
Y=ROCE	107	-7.010	20.100	2.312	3.475
X1= Equity Investment	107	.424	1.612	.888	.234
X2=Conditional Loans	107	5.900	43.700	20.563	8.075
X3=Convertible Debentures	107	8.563	13.132	10.655	1.280
Valid N (Listwise)	107				1

Source: Author (2023)

Financial performance of technology start-up firms in Kenya was expressed in Return on Capital Employed (ROCE). The highest ROCE was 20.1% and the lowest was -7.01%. Standard deviation was 3.48, and mean of 2.31%.

Availability of business angels, stage of financing, and frequency of financing, on the other hand, were representative of the level of equity investment (X1). The lowest score was 0.42, the highest score was 1.61, mean at 0.89, and standard deviation of 0.23.

Conditional Loans, the second independent variable, were evaluated using the repayment requirements, interest rates, and borrowing limits. The companies recorded conditional loan rates ranging from 43.7% to 5.9%, mean standing at 20.56% and standard deviation at 8.7 percent.

Convertible debentures were the other independent variable measured in this study. It was measured by Long-term goals of Need for control and Ratio of conversion. The company with the highest convertible debentures had a recorded a percentage of 13.13, while the lowest was 8.56, averaging of 10.66 and 1.28 standard deviation.

Correlation Analysis

To establish the nature of the relationship among the study variables, correlation analysis was performed. The matrix of Pearson correlation coefficients is shown on table 6.2 below.

Table 6.2 Correlation Matrix

	Y=ROCE	X1= Equity Investment	X2=Conditional Loans	X3=Convertible Debentures
Y=ROCE	**1**			
X1= Equity Investment	0.384	1		
X2=Conditional Loans	0.218	0.266	1	
X3=Convertible Debentures	0.410	-0.513	-0.4120	1

Source: Author (2023)

Correlation of variables can range between 1 and -1. The correlation between the variables is weaker the closer it is to zero. There is a negative correlation when there is an inverse correlation between the variables, which means that one variable falls when the other one falls, and vice versa.

The dependent variable, financial performance, and X1 are inversely correlated. This is means that the increase in equity financing, increases financial performance of the technology start-up firm. This would more so be probable if issue of availability of Business Angels, stage of Financing and Frequency of financing is expressed.

The dependent variable has a positive correlation with Conditional Loans (X2). This could imply that good repayment terms, Interest rates borrowing requirements increases the financial performance of the technology start-up firm.

The third variable, X3 (Convertible Debentures), has a positive correlation with the dependent variable as well. This would imply, Long-term goals, Need for control and Ratio of conversion, affects the Return on capital employment of technology firms.

Diagnosis Tests

Wooldridge (2013) proposes performing diagnostic tests before running a regression test to determine if the data is suited to parametric evaluation. As a result, Kumar (2015) proposes that diagnostic tests be performed prior to investigating the association across more than one variable in regression.

When performing regression analysis, diagnostic tests are essential because they confirm that the data is suitable for parametric tests. Violations of the linear regression analysis, as explained by Chatterjee and Hadi (2012), result in data that is skewed, which impacts significance levels, resulting in conflicting findings. Diagnostic tests used for this research were; normality test, multicollinearity test, and autocorrelation test.

Normality Test

Normality test, as defined by Ghasemi and Zahediasl (2012), compares the sample results to a set of normally distributed values sharing similar mean and standard deviation values. The Shapiro-Wilk test was applied to assess normality for this work. For most academics, the Shapiro-Wilk test provides the most accurate results for determining whether data are normal (Thode, 2002). Based on the correlation between data and normally distributed scores, the Shapiro-Wilk test is used. According to Razali and Wah (2011), data fails to follow normal distribution if the p-values <0.05 on the Shapiro-Wilk test. The sample wasn't evenly distributed, which was the study's null hypothesis. The sample distribution is not normal if the test result is statistically significant. Table 6.3 shows results of tests conducted on each research variable. The Shapiro-Wilk test is scored on a scale of 0 to 1. Values closer to one show regularly spread data. Values less than 0.4 show skewed data (Field, 2013).

Table 6.3 Normality Test

Variables	Statistics	Shapiro Wilk DF	Sig
Equity financing	.977	107	.440
Conditional Loans	.789	107	.094
Debentures	.763	107	.062
Interest Rates	.962	107	.112
Financial Performance	920	107	.058

Source: Author (2023)

For normality testing, null hypothesis claimed an irregular distribution of the data. According to test findings in table 6.3, all variables had a p values >0.05. The importance of financial performance

was 0.058, while the relevance of equity financing was 0.440. The null hypothesis was rejected since residuals were not substantial at the 95% confidence levels, revealing that the data in this investigation had a normal distribution and could be used to infer population information.

Multicollinearity Test

Cohen and Cohen (2003) proposed performing a multicollinearity test with a variance inflation factor (VIF) and a tolerance level. Field (2013), posits that such a result reveals whether or not the predictors have a significant link with one another. According to Myers (1990), a VIF score of 10 or more shows multicollinearity across the independent variables. Furthermore, a <0.1 tolerance denotes significant multicollinearity issue. In multiple regression especially, multicollinearity is common and has negative implications for research, especially when correlations between independent variables are significant (Field, 2013). Table 6.4 displays the results of the Multicollinearity Test.

Table 6.4 Multicollinearity Test

Model		Collinearity statistics **Tolerance**	VIF
1	Equity financing	.567	1.759
	Conditional Loans	.539	1.850
	Debentures	.908	1.100
	Interest Rates	.687	1.452
	Financial Performance	.892	1.119

a. Dependent Variable: Financial Performance

Source: Author (2023)

Landau and Everett (2004) claim that multicollinearity does not exist when VIF is <10 and tolerance is >0.1., Tolerances of less than 0.1 and VIFs of less than 10 were present for all research variables, as shown in Table 6.4. The data showed that all variables had tolerances >0.1 and VIFs <10. Because of this, all predictor variables were kept in the model and the data in this research was not subject to multicollinearity.

Test for Autocorrelation

Autocorrelation indicates that the empirical model error factors are dependent on one another. The residuals or error terms of a regression analysis have a tendency to be autocorrelated, which implies that the data is associated with itself rather than with some other data (Brooks 2008). If the model was poorly built, the observations were dependent on variables other than time, the dependent variable had measurement errors, or all three, autocorrelation could appear in an ordinary least square (OLS) regression. An autocorrelation test was necessary to show that the study model was correctly specified and the regression analysis outcomes were the best linear unbiased estimate (BLUE), even though the study did not use panel data. In traditional analyses (OLS regression) that assume observation independence, autocorrelation may therefore present problems. The residuals

of a statistical regression analysis can be tested using the Durbin-Watson statistic to see whether autocorrelation is present. Results from the Durbin-Watson test frequently range from 0 to 4. Values under 2 show positive autocorrelation, while values between 2 and 4 show negative autocorrelation. In this study, the autocorrelation problem or cross-temporal correlation of the data was tested using the Durbin-Watson test. The outcomes are displayed in the table 6.5 below.

Table 6.5 Test for Autocorrelation Results

Model		Durbin Waston
1	Equity financing	1.921
	Conditional Loans	1.827
	Debentures	2.127
	Interest Rates	2.035
	Financial Performance	2.072

Source: Author (2023)

The data in table 6.5 shows a 1.827 to 2.127 range in the Durbin-Watson values. According to Garson (2012), Durbin-Watson statistics vary from 0 to 4, with values nearer to 2 indicating independent observations and values closer to 0 or 4 indicating stronger positive or negative autocorrelation, respectively. As a result, it was determined by employing Garson's (2012) recommendations that the model's residuals were not auto-correlated, which means that inferential statistics can be performed on the study outcomes.

Regression Analysis

To assess how the regression model predicted the financial performance of the technology start-up firm, regression analysis was done. Outcomes of regression analysis are outlined in this section.

Model Summary

The regression model is summarized in Table 6.6 below.

Table 6.6 Model Summary

Model	R	R SQUARE	Adjusted R Square	St. Error of Estimate
1	.622[a]	.387	.362	2.776

a. Predictors: (Constant), X3= Convertible Debentures, X1= Equity financing, X2= Conditional Loans

Source: Author (2023)

R square is a statistical metric which shows the closeness of data fit to the regression line. Coefficient of determination is the name given to it. A low coefficient of determination indicates a partial prediction on the model on the unevenness of the data around the mean. An R-square of 100 percent demonstrates that a model is capable of forecasting the variability of data around the mean. Adjusted R square, however, only displays the R square that has been adjusted for the number of variables that are present.

The model can be used to explain 38.7% of the variance in the data around its mean, according to the table's R square, which is 0.387.

ANOVA

The significance of regression models was tested using the F significance test for regression models. The ANOVA summary of the significance test is shown in the Table 4.7 below

Table 6.7 ANOVA Summary of the Significance Test

Model	Sum of Squares	Df	Mean square	F.	Sig
Regression	359.844	5	119.94	15.562	0.00[b]
1 Residual	570.379	89	7.708		
Total	930.233	950			

a.   Dependent Variable: Y=ROCE

b.   Predictors: (Constant), X3= Convertible Debentures, X1= Equity financing, X2= Conditional Loans

Source: Author (2023)

To determine whether the results are statistically significant as a whole, the F statistic and p value must be combined. The null hypothesis is rejected when, in an ANOVA, the p value is less than alpha and the critical value of F is less than the calculated value of F. The calculated F value, 15.562, is higher than the critical F value, $F_{(3.77, 0.05)}$, derived from figures in the table above.

The p value is .000b and this shows that it is less than alpha value which is 0.05. This therefore means there was significant influence of venture capital financing on financial performance of technology start-up firms in Kenya

Regression Coefficients

The coefficients of the regression model were also estimated and then tested for significance. Table 4.8 below shows the coefficients of the regression model and the result of the significance tests.

Table 6.8 Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95%Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-14.481	4.262		-3.398	.01	-22.973	-5.989
X1= Equity Investment	-2.892	1.470	-.195	-1.967	.053	-5.821	.037
1 X2= Conditional Loans	.171	.046	.397	3.675	.000	.078	.263
X3=Convertible debentures	1.488	.286	.548	5.203	.000	.918	2.057

Source: Author (2023)

Table 4.8 shows unstandardized coefficients for the y intercept as 14.48 and error term as 4.262.

Coefficients for X_1, X_2, and X_3 are -2.89, 0.171, 1.488.

The model $Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + \varepsilon$ thus becomes;

$Y = 14.48 - 2.89X_1 + 0.171X_2 + 1.488X_3 + 4.26$

As presented in table 4.8, results indicate that all elements held constant (Equity Investment, Conditional Loans, Convertible debentures), financial performance would move by 5.432 units on the positive.

The X1 correlation coefficient (B1=-2.892, P= .053) suggests that the correlation between financial performance and equity investment was negative and not significant. These findings also suggest that equity investment may be employed to describe variations in financial performance. The study results additionally show that a one-unit change in equity investment results in inverse change of 2.892 unit changes in financial performance.

The Conditional Loans coefficient (the coefficient of X2) (B2=.171, P=0.000) reveals a positive and significant correlation between Conditional Loans and financial performance. The p-value .000 <.0001 suggests that changes in conditional Loans have a positive and highly significant effect on changes in financial performance. A 0.271 unit variation in conditional loans changes the financial performance of the technology based start-up by 0.271 units.

The findings on how convertible debentures influences the financial performance of technology-based start-ups are shown by the coefficient of X3 (B3=1.488, P=. 000). The results show that convertible debentures have a significant, favorable impact on changes in financial performance. The results demonstrate that a unit change in a convertible debenture will caused an adjustment in the financial performance of technology based start-ups by 1.488 units.

CONCLUSION AND RECOMMENDATION

Conclusions

The independent variables (equity financing, conditional loans, and convertible debentures) and the dependent variable (financial performance) were strongly correlated positively, revealed by the correlation coefficient (R) of 0.622. The adjusted r-squared value, of 0.362, illustrates changes in equity financing, conditional loans, and convertible debentures responsible for 36.2 % of the changes in financial performance.

According to the research findings, equity investment and financial performance had a non-significant and inverse correlation. The findings therefore accepts the hypothesis that equity offered by venture capitalists had an insignificant influence on the financial performance of technology start-up firms.

The study established that that there was a case for changes in the financial performance attributed to conditional loans. The study also rejects the hypothesis that conditional loans offered by venture capitalist did not significantly affect the financial performance of technology start-up firms.

The study revealed that convertible debentures and financial performance had a correlation that was both positive and significant. The findings also rejected the hypothesis that convertible debentures was not bear a significant level of influence on the financial performance of technology start-up firms in Kenya

Recommendations

This work recommends that technology start-up firms that seek funding from equity investors ought to consider their stage. The study noted that those in the mature stages were able to record a higher ROCE than those in the earlier stages. The study therefore would recommend equity as a form of financing for more established technology based start-ups.

The research further recommends that a mix in venture capital financing could be beneficial to Technology based start-ups. By seeking to combine two or more venture capital finances then they are able to leverage on the advantages of multiple approaches.

The research also recommends that resources brought to the technology start-up firms be fully utilized for the purposes intended. Revenue generating activities should always take precedence over working capital. Maximum utilization of capital increases the ROCE.

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