

# **A Study on High-tech Startup Failure**

## **Antecedents, Outcome and Context**

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Abstract <p>A significant number of startups fail during their first years of operations, and most of them crash within five years. A wide range of reasons for startup failures has been identified in the literature. However, most of the reasons for startup failures are too general in that they focus on startups in general. In this regard, not every factor may be responsible for the failures of some startups.</p> <p>Although there are adequate investigations that have provided substantial evidence about different reasons that cause startups failure, this study aimed to review these reasons collectively to determine how they relate to high-tech startup failure.</p> <p>This study used a qualitative research method to collect and analyze data from 15 founders of high-tech startups in the United States (US), Finland, and Canada. The researcher conducted interviews through Skype and analyzed data using thematic analysis to derive relevant themes to the study. Likewise, the researcher conducted a profound, systematic review to identify themes relating closely to startup failures.</p> <p>The results showed that high-tech startups failures relate closely to product and market challenges (product timing difficulties, product design problems, improper or absence of selling strategy/ distribution channels, and small market size), financial problems (initial undercapitalization and debt burden), and management issues ( lack of competent teams and human errors).</p> <p>The study showed that a wide range of factors leads to the failure of high-tech startups. Therefore, founders and personnel working in these high-tech startups should pay attention to the identified areas to minimize the chances of failure.</p>		
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# 1. Introduction

## 1.1 Background

The advent of technologies and innovative ways to make life easier has ushered in a period that witnessed small companies' emergence that experience exponential growth. They are usually referred to as startups. But how does one define a startup? According to Bednár & Tarišková (2017), a startup is an entity in its first stages of operations, aiming to monetize its founder or founders' unique idea or product. The initial funding of a startup is usually from the founders' pockets or their families and friends. For a startup to monetize their idea or product, they need to develop, test, and market, which requires a substantial amount of money. Therefore, one of the startup's challenges is to raise this amount of money, often requiring that the founders develop a good argument for their idea or a prototype of their product to support their pitch to potential investors. However, according to Graham (2012), it does not necessarily mean that a startup should venture into fundraising or be related to technology and aim for growth.

Moreover, a startup must develop a valuable idea that can be marketed to a wider audience, which is already taken. According to Blank & Dorf (2012), a Silicon Valley entrepreneur who started the Lean Startup movement, "a startup is a temporary organization searching for a scalable, repeatable, profitable business model." To generalize, a startup is a group of talented entrepreneurs that design and develop innovative ideas that are investable and have the potential for a business with a larger impact and opportunities in society.

The history of startups relates to the "tech bubble" that happened between 1997 and the early 2000s, an event where there were more supplies of technology than the number of individuals buying them due to the increase in technology stocks Griffin et al. (2011) and one of the biggest speculative bubbles in history. During this time, many Internet-based companies pitched to a huge number of investors, making it lucrative for companies to pop up and increase their stock prices by just appending a *.com* or *e-* to their company names. However, startups did not start with the tech bubble. Still, it has become widespread during this period because it is also during this period when

the successful startups we know today, such as Google (n.d.), began their existence. These startups operated on the actual business model of a startup. Google is a perfect example of a startup because it began as a PhD research project, called BackRub, in Stanford University of founders Larry Page and Sergey Brin, laying the foundation for the very popular search engine (Google, n.d.). It stemmed from the goal of creating a search engine on a very large scale. A startup should aim for – growth – finding a niche market and creating its niche.

There are five types of startups (Blank & Dorf, 2012):

- *Small Business Entrepreneurship* refers to service-oriented businesses, such as mini-marts, laundry shops, and barbershops, where the owner does not aim to take over the industry but to make a profit from well-paying customers.
- *Scalable Startup* refers to a company started by entrepreneurs who believe their ideas can create a change globally and bring them sales that can amount to millions or billions of monies. In return for a rapid expansion, it requires a huge amount of third-party investments, which is very attractable to capital risks. Examples of this type of startup are Google, Facebook, Uber, and Twitter.
- *Buyable Startup* refers to companies that emerged from ideas that are low-cost but are meant to be purchased by bigger companies who are after the talent more than the business itself. Examples of this type are web and mobile applications.
- *Large Company Entrepreneurship* refers to companies with a definite life cycle that create new innovative products in response to changes in the external environment such as customer needs and expectations, market competition, legislations and regulations, and new technologies.

- *Social Entrepreneurship* is similar to scalable startups in terms of being driven by the desire to change the world, albeit different in their pursuit to create a deeper impact on society rather than just earning huge amounts of money for their idea. Examples of this type of startup are Solarfood (Solar Foods announced a partnership with the European Space Agency to research food programs on Mars.), Mifuko (Helsinki-based designers Minna Impiö and Mari Martikainen's design company, and an online shop that produces bags, baskets, jewellery, and shoes from recycled material in Kenya.), and ResQ (Founded to reduce food waste, ResQ focuses on restaurants, bakeries, cafes, and hotels. Their mission to “leave no meal behind” saw them rescue more than 2M portions by allowing consumers to discover new restaurants at a 50% discount rate)

The common denominators among these different types of startups are entrepreneurship and innovation, but each type uses customer focus to help them reach success. Identifying and understanding the needs and expectations of potential customers can create an enjoyable experience for them.

A high-tech startup is a company that aims to deliver new or existing technology products or services to the market. The high-tech industry includes companies that focus on science, technology, engineering, and mathematics, playing an important role in the United States' economy (Wolf & Terrell, 2016). Innovation plays an important role in high-tech startups. Innovation is associated with the idea of adopting the latest and trendiest technology, but innovation is more than that. It is what lies between technology and customer needs, which means that innovation is the outcome of improving customer-related issues based on their needs and expectations are relevant stakeholders. And to enable a successful venture, high-tech startups should use proven technology instead of trying to be too innovative by using disruptive technology.

## **1.2 The Motivation for the Research**

Some startups reached the pinnacle of success, such as Airbnb, Instagram, Pinterest, and LinkedIn, to name a few. However, not all startup stories end up in success. In 2012, a Harvard Business School professor, Shikhar Ghosh, conducted research based



on data from more than 2000 companies that received venture funds between 2004 & 2010 (Gage, 2012). His study results showed that 3 out of 4 startups fail based on the definition of failure as "failing to see the projected return on investment." Hassan (2019) listed ten startup companies that failed to reach a successful ending, three of which are presented below as examples:

- *Laurel & Wolf*, an online marketplace for interior design that started in 2014, received a total funding amount of \$25.5M from 14 investors and experienced operational and management challenges that led to customer dissatisfaction and unhappy employees, which became the precursor for their virtual shop to shut down in March 2019.
- *Call9* is a startup founded in 2015 to help patients in-home care relay their doctors' issues without going through 911 or waiting in nursing rooms. The company received a total of \$34M from 10 investors but closed in 2019 due to a bad business model.
- *Aria Insights* is a startup that was founded in 2008 and specialized in the development of highly advanced drones, such as the Persistent Aerial Reconnaissance and Communication (PARC) that can fly for days instead of the usual hour-length fly time of drones. They received a total funding of \$39M from 8 investors. Still, they shut down in 2019 due to multiple reasons, such as losing their founder in 2018 and refocusing their operations from developing drones and its technology to developing smart AI systems and drone programs, to name a few.

According to the US Bureau of Labor Statistics (2020), approximately 20% of new businesses experience failure during the second year of their operation, 45% during the fifth year of operation, and 65% during the tenth year of operation. Moreover, only 25% of these businesses reach to operate for 15 years or longer. Studying the data of

the US BLS, the following are the common factors that contribute to the failures of new businesses:

- There was no adequate market research conducted – Not being able to investigate the market that the business aims to target will result in trying to push your product or service to a market that does not need it.
- There was no adequate planning for the business – While it is inspiring that there are several successful startups that do not have a business plan to start with, a successful business is built upon a solid foundation called a plan. During the planning phase, goals and objectives are established to provide a framework for the business. The business plan will provide you with an understanding of what needs to be done, who needs to do it when to do it, where to do it, and how to do it. Moreover, a concrete plan will tell the business owners how to address possible problems that may arise while the business is in operation.
- There was no adequate financing. If there is little capital to work on and problems start to arise during the operations, the company cannot opt for a loan to save the business.
- There were no good internet presence and marketing. Like not having foot traffic for a business in a bad location, not having enough Internet presence when people rely on everything online will mean bad business for the owner. Furthermore, marketing is an important aspect of the business if it will help reach the right people.
- The expansion was done abruptly. Being successful entails an expansion for the business, but it should not be done without adequate planning because an expansion is like starting the business over.

The current study aims to identify the factors that contribute to high-tech startup failures to support future research on analyzing their outcomes by addressing how startups that experienced failures progressed and developed new business ventures. This study will also help future startups change how they must behave towards business and its practices considering these failures and how they can provide them with a new perspective on decision-making.

The study focuses on the antecedents that contribute to the outcome of failure in high-tech startups. The study's main goal was further divided into the following assumptions upon which the questionnaire was based to identify and analyze the factors that contribute to high-tech startup failures.

Most startups do not have:

1. A clear understanding of the context of their organization
2. A concrete risk management before starting their operations
3. Measurable goals and objectives
4. Customer focus
5. Established processes and controls

As such, this research answered the following questions

6. What are the causes of high-tech startups failures?
7. How be the outcomes of high-tech startup failures analyzed to provide a framework for the improvement of business behaviors and practices?

## **2. Literature Review**

When a business fails, losses to the owners, creditors, and investors are incurred, which may or not be recoverable, leading to the shutdown of the business. The event that leads to a business failure is not something one can easily predict but one that can be easily prepared for. The sector of high-tech startups has seen a tremendous amount of growth in the number of businesses that have opened, but it has also witnessed the fall of many of these businesses. This section of the thesis explored the studies that have investigated startups and their failures and how these can be related to the current study.

Before one starts a study of startup failures, and analysis of the ecosystem of startups in the area of interest may provide insights on how the study may be designed to gather as much information as needed to construct its outline. Bui (2016) conducted a

study on the ecosystem of startups in Finland that aimed to gain insight and knowledge to clarify questions related to the activities and environment of entrepreneurs of Finnish startups as compared with their Nordic counterparts that would provide a framework for the management of Finnish startups to improve the quality of their ecosystem. Moreover, this study used the qualitative method of research that combined the collection of primary and secondary data from academic literature, Internet sources, and interviews. This study is relevant to the current study because it also aims to focus on Nordic startups and utilize the qualitative research method through an interview to gather information about high-tech startup failures. Similarly, Hermanseter & Mull (2017) conducted a cross-sectional study using an online survey that investigated 49 international startup companies in a Nordic startup community in Silicon Valley in terms of the influence of the manager's international exposure to the performance of the startup that ventured internationally. Their study is a great source of information on Nordic startups, especially in the international setting. Moreover, their study also discussed the relevance of management in the performance of a startup, which is one of the factors considered in this study to have an impact on high-tech startup failures.

## 2.1 Management Skills, Partnerships, and Competence

In 2005, Mehralizadeh & Sajady (2006) presented a paper at the European Conference on Educational Research on the factors related to the success and failure of 51 business startups in Ahvaz City. The study both explored the success and failure perspectives of business startups. The findings show that from the point of view of successful entrepreneurs, their success is related to their suitable management skills, the selection of qualified personnel with skills relevant to their business, the continuing professional development of their people, and appropriate planning and organization of their business. Meanwhile, from the perspective of failure entrepreneurs, their failure is related to their weak management skills, personnel that lack the appropriate training and qualifications, and ineffective planning and business organization. This study is relevant to the current study because it relates to the individual and organizational factors to the success and failure of startups in Iran. Similar to the objectives of the current study, the factors were used as bases for

providing recommendations on how future entrepreneurs can address the inadequacy of these factors and ensure that their business will reach its success.

According to Van Gelderen et al. (2006), a lack of human capital is another cause of the failure of startups. Many startups fail because they lack the knowledge, skills, education, and experience to operate them. The absence of these human capital variables is likely to adversely influence the development and actualization of a business idea. For instance, the lack of startup experience among nascent entrepreneurs makes them unable to exploit learning opportunities. The absence of work experiences deprives entrepreneurs of the skills they need to operate their businesses successfully. As such, the absence of these human capital variables among entrepreneurs leads to the failure of startups.

The process of entrepreneurship is affected by the combination of individual, organizational, and contextual factors (Shepherd et al., 2019). In a similar context, Shepherd & Wiklund (2006) believe that failure is a process more than it is an event. As a process, failure is influenced by both internal and external factors. Applying the process approach to failure, management must understand the five elements of a process, namely, input, output, controls, resources, and process transformation. This perspective is relevant to the current study because it can provide a more holistic approach to understanding what contributes to failure in high-tech startups. And for a high-tech startup to be successful, the management must consider all aspects of the business that are likely to have an impact, both negatively and positively, on its viability as well as exhibit skills in identifying opportunities and mitigating risks.

Stayton (2015) investigated four innovative fast startups in the cleantech industry to address the downside of rapid emergence in entrepreneurship. The study explored the antecedents to and outcomes of a rapidly changing environment of startups intending to contribute insights to business incubation, which influences the time it takes to launch innovative businesses. Semi-structured interviews were conducted as well as an analysis of private and public records. The focus of the study is the risks and challenges that may be encountered during the quick start of an innovative startup. The study concluded that if risks can be identified, actions to address them may lessen the impact on the startup. Therefore, having a better understanding of the identified risks and applying appropriate mitigation action plans will contribute greatly to the

improvement of the success rate of startups. The study also recommends further study using more case studies are needed to come up with a more solid groundwork for recommendations for improvement.

Again, Atsan's (2016) study showed that a significant number of businesses fail because of problems associated with partnerships. In most cases, businesses fail because some partners tend to prioritize their relationship over the business's welfare. Notably, this situation is common when business partners are siblings, in-laws, and friends. Likewise, the failure of businesses is associated with the lack of critical information and mentorship of entrepreneurship. Many entrepreneurs start businesses without managerial skills and "secrets of the trade," so they fail.

Likewise, Van Gelderen et al. (2006) study revealed that push motivations and high ambitions tend to lead to business failures. When individuals are forced to start businesses or are on the lookout for organizational employment, they tend to fail because they make irrational decisions. In some cases, entrepreneurs tend to write unrealistic business plans that have high ambitions. Some startups lack business plans, and hence they end up neglecting some important business decisions or paying attention to unimportant activities.

Again, Ooghe & De Prijcker's (2008) study revealed that optimism and risk-taker behaviours are likely to cause failures in startups and already established businesses. Entrepreneurs are likely to threaten their startups' survival if they engage in risky behaviours such as investment in products that do existing markets. Likewise, managers are likely to cause business failure if they ignore shareholders' interests by favouring risky projects. In a different vein, management errors relating to a corporate policy may quickly lead to business failure or bankruptcy. For instance, a corporate policy that discontinues a particular product in the market may lead to a business's failure if it is the main source of income. Mainly, these errors can be in the form of heavy capital expenditures, underestimated expenditures, and low sales volumes.

## 2.2 External Environments

In 2008, Ooghe & De Prijcker (2008) investigated failure processes, showing that the external causes of failure are the general and immediate environment of the company,

whereas the internal causes are the management and its policies. The causes of failure are shown as five interacting aspects, namely general environment (i.e., factors such as economics, social, politics, technology, and international), immediate environment (i.e., customers, external providers, competitors, creditors, financial institutions, and stockholders), management aspects (i.e., motivation, skills, qualities, and personal), corporate policy (i.e., those governing personnel, strategic planning, investment, operations, marketing, finance, and administration), and company characteristics (i.e., size, industry, niche, and maturity). This model is relevant to the study because it further digests the factors that contribute to failure into more details and relates it to the different elements of the business that may provide a better understanding of the root cause of failure in high-tech startups.

Moreover, Ooghe & De Prijcker's (2008) study established that a company's attributes such as size, maturity, flexibility, and industry play a role in their bankruptcy or failure. Startups in new operations and small in size tend to be at a higher risk of collapsing than already established businesses. The higher risk among startups is associated with newness liability, which mandates them to build authenticity and steady relationships with their stakeholders. Again, and irrespective of the industry they operate in, startups have lower leverage than existing firms in acquiring raw materials, resources, market, and human capital. In this regard, startups have a higher chance of failing than established business entities.

Altman (1983) conducted a study that aimed at determining the factors that lead to business failures. In particular, the author identified economic stress as a major contributor to business failure. According to the study, economic stress constitutes the most devastating factor for vulnerable businesses such as startups. Using the data from 1950 to 1981, Altman (1983) showed that the recessionary periods recorded increased failure rates of businesses during that time. During those periods, business failures are associated with a negative correlation between economic stress and sales (and earnings).

Likewise, Bruno et al. (1987) identified other factors that lead to business failures. Some of these factors include the decline of gross national product, poor stock market performance, and dwindling money supply. Mainly, recessionary periods hit startups hard through diminishing sales and making investors nervous about sustaining losses.

Besides, uncertain technology, uncertain strategy, high initial costs, flooded market, lack of government support, short time horizon, and first-time buyers are other factors that lead to business failures. Notably, first-time buyers imply that customers are not yet used to the product or services, and hence they will respond slowly to the startups. Since many startups operate with constrained resources, slow sales response leads to the failure of some businesses. Moreover, startups tend to use uncertain strategy and uncertainty because they operate under a learning environment where they keep making business decisions to determine their outcomes. If some of their decisions result in substantial financial losses, then startups end up failing. Besides, if startups cannot align their business goals and objectives with customer expectations and preferences, they end up failing. Notably, when strategies and "rules of the game" are unclear to venture capitalists and startups, they account for almost one-third of startups.

Again, Van Gelderen et al. (2006) study showed that the environment under which startups operate determines their failure or success. In particular, the environment that encompasses network, financial, and ecological factors influence startups' operations. For instance, many startups lack a strong network or exposure to lenders, customers, and suppliers. In this regard, many startups find it hard to compete for resources, raw materials, and clients with existing businesses. Political turbulence, media, influence rates, and culture hurt startups. For instance, political turbulence hits startup businesses more because they still do not have sufficient resources to operate and do not have a large base of customer loyalty. Likewise, many startups experience culture shock because they lack knowledge about customers' tastes and preferences.

Atsan's (2016) study established that economic conditions, change in government policies, and unexpected, unlike events, are principal causes of business failures, including startups. For instance, a change of management in startup critical partners such as lenders, suppliers, clients, and customers, tends to have adverse effects on businesses' operation. New management in suppliers may withdraw their commitment to a business, hence cause difficulties in operation and eventually leading it to the business's closure. A change in government may lead to crisis, foreign exchange fluctuations, standby agreements, high taxes, economic meltdown, new banking laws



that affect the business's ability to manage their credit and debt. Further, accidents during the delivery of goods may lead to the failure of businesses.

Kuckertz et al. (2020) conducted qualitative research on the impact of the COVID-19 pandemic on startups. The study's findings noted that the COVID-19 pandemic was detrimental to startups because it led to illiquidity through the decline of sales. Besides, the study results showed that crises like the COVID-19 pandemic led to existential fear that eventually leads to their failure. Likewise, crises create hostile climates for innovations because businesses focus on crisis response and "life-saving" measures (Kuckertz et al., 2020). Many entrepreneurs avoid investment in innovations in fear of risks associated with the underlying business environment. Likewise, pandemic and other forms of crisis create additional hurdles in funding. Investors curtail their willingness to invest in startups because of fear that the existing problems would curtail development and development. As such, these make startups have little financial support to capitalize on potential markets and hence fail. Again, the study's findings showed that crises increase hurdles relating to the hiring of personnel and management, reorganization of business structures, and interruptions in the smooth running of businesses (Kuckertz et al., 2020). For instance, the COVID-19 pandemic led to some businesses' lockdown, hence interrupting their operations through the loss of contact with existing customers and suppliers.

Akter & Iqbal (2020) studied the reasons for the failure of platform startups through the proposal of a theoretical structure that explores the elements that impact their failure. They conducted a systematic review of 113 sources of literature. The results of their study revealed that three elements have an impact on the failure of platform startups, namely, organizational, business model innovation, and environmental. Other than these factors, the study results also revealed that finance, market, and ecosystem factors contribute to the failure of platform startups. Similarly, (Hasani & O'Reilly (2020) analyzed the effects of antecedents such as technological, organizational, environmental, and managerial factors on the performance of 389 Malaysian startup companies using the principal component analysis and the orthogonal model with Varimax rotation. The findings of their study showed that technological and environmental factors have positive effects on the performance of startups. Moreover, managerial characteristics do not have positive effects on startup performance. These

studies are relevant to the current study because they recognize that there is not a single reason for startup failure. The combination of several internal and external factors contributes to the failure of platform startups, which can be expanded to the context of high-tech startups. Furthermore, these studies also recommend that further research should be done in light of these findings to gather substantial information to make a more generalized conclusion regarding the reasons why startups experience failure.

Altman's (1983) study also showed that price level changes or inflation led to businesses' failure. Increased inflation tends to make startups and other businesses unable to pay their debts. Notably, the inability to pay loans means that businesses cannot operate smoothly or access additional credit. Again, inflation cuts the purchasing power of consumers, and hence it leads to the plummeting of startups' sales. Firms tend to pass increased prices to consumers, some of whom become unable to afford them. Given that most of the startups have a small market share, their sales' plummeting tends to lead to failures.

### 2.3 Improper Business, Product, and Selling Plans and Strategies

A case study of a high-tech startup over 4 years revealed that despite being initially successful, the insights provided by ostensible customers led to its product, business, and organizational failure (Scaringella, 2016). This is a rare case because instead of the popular belief that customer focus helps in improving the business, the counterproductive feedback received by the company brought negative impacts to the process of product innovation.

Cantamessa & Gatteschi (2018) explored 214 post-mortem reports of startups using descriptive statistics and showed that an inadequate business development strategy contributes greatly to the failure of startups in most cases examined. By providing a methodology that can be repeated and scaled up to databases of post-mortem documents, the study aims to contribute to the literature and help future research in deriving patterns among startup failures. Similarly, Giardino et al. (2014) aim to address the gap in the literature to address failure characteristics during the early stages of startups to raise awareness and provide insights to future ventures. The

behavioural framework developed in this study has helped identify that the inconsistency between strategies and implementation of management can lead to the failure of software startups. It emphasizes the need to ensure that whatever was planned needs to be implemented accordingly to prevent the risk of failure in the early stages of the startup. These studies are very important to the objective of the current study as they shift the focus to the antecedents of failure instead of success in the high-tech startups that are usually studied in the literature.

Nyman (2020) explored the similarities among reasons of success and failures among six Finnish startups using semi-structured interview questions among startup founders to check if there is a pattern between success and failure. Based on the conducted interviews, business and people skills play important roles in startup success.

Ooghe & De Prijcker's (2008) study results showed that a primary initial shortcoming of startups relates to the absence of managerial or industrial experience. As such, many startups lack necessities in their business plans, and they lack a strategic advantage. In other words, startups fail because they lack strategic advantages, such as resources, market, competence workforce, and location. Notably, a lack of a competent workforce tends to lead to improper management of existing resources and hence cause severe operational inefficiencies. A combination of these factors makes the long-term survival of startups very unlikely.

Giardino et al. (2014) conducted a study to establish the primary challenges that early-stage software startups. The authors relied on a large-scale survey constituting 5389 complete responses. The findings showed that high-tech startups experience challenges relating to thriving in technology uncertainty, building entrepreneurial teams, managing multiple tasks, acquiring initial funding, targeting a niche market, reaching the breakeven point, defining minimum viable product, acquiring first reliable customers, and delivering customer value. For instance, high-tech startups find it hard to attract reliable customers (Giardino et al., 2014). Mainly, this is because customers must learn to trust high-tech startups before they can commit themselves to buy their products. Again, high-tech startups attract fewer investors and hence initial undercapitalization. Many high-tech startups lack clear products and business plans, and therefore investors avoid them. Again, the study findings revealed that many high-tech startups tend to have personnel, which lack diversity (Giardino et al., 2014). For

instance, a high-tech startup producing artificial intelligence is likely to hire inexperienced computer scientists only. The hiring of inexperienced workers means that high-tech startups do not have other people to work in other parts of the businesses, such as financial and human resource managers.

Ooghe & De Prijcker (2008) conducted a study to gain a profound understanding of failure processes in companies. In particular, the study sought to give this studied phenomenon a more grounded knowledge of the connection between firms' characteristics, primary causes of failure, and economic effects. Using a literature review and in-depth case study research, the authors identified four types of failure processes – the failure process associated with unsuccessful startups, ambitious growth companies, dazzled growth companies, and apathetic established companies. Again, the study revealed that management errors, corporate policy mistakes, and external factors cause company failure. For instance, inappropriate management skills and quality pose a threat to companies' survival, and hence it is linked to startups' failures. Likewise, if these unqualified managers are reluctant to accept advice from their colleagues or other parties, they substantially lead to the decline of companies' survival.

## 2.4 Under Capitalization, Credit Markets, and Improper Financial Management

Atsan (2016) reviewed the primary causes of business failures and learning outcomes that emanate from such experiences. The researchers used data they collected through interviews done on 13 entrepreneurs who had operated for at least three years. Atsan's (2016) study focused on automobile, logistics, supplier, construction, software, ceramic, iron, logistics, textile, and advertisement. In particular, the researchers conducted a thematic analysis of interview notes, whose results showed that the largest number of mature business failures was explained by the integrative approach, which includes both individual/ organizational (internal) and environmental factors. Notably, some of the identified internal factors of businesses' failure included the lack of financial skills, such as the inability to perform financial controls and calculate costs appropriately. Another identified lack of financial skills that leads to business failure is improper management of loans.

Likewise, Altman's (1983) study noted that businesses fail because of investor expectations that are not aligned with business objectives. Businesses tend to fail when investors do not take the necessary steps. A business will not succeed if the investment community expects that the business will fail, which is reflected in the prices paid for financial asset ownership. In most cases, investors are not willing to risk their money with business startups, and hence the prices of stocks of these entities are in some cases below the value of the financial asset ownership. As such, the prices of common stocks and business failures have a strong, though not direct, relationship. A more direct relationship between business failures and stock price may occur if the definition of insolvency in bankruptcy (a situation where a firm's liabilities exceed its assets) is considered. Therefore, a fall in stock prices below firms' liabilities leads to insolvency and business failure. Overall, investors' expectations as denoted by the price of stocks determine the extent to which a business might fail or succeed in the future.

Nyman (2020) study results revealed that adequate funding combined with the proper human skill and customer-centric philosophy are also key contributors to a startup's success. The study is relevant to the current study because the area of concentration is Finland, which is closer to the context of business in the Nordic setting.

Van Gelderen et al. (2006) studied the success and risk factors of startups during their initial stages. To determine why some startups succeed and another fail, the authors used a sample of 517 nascent entrepreneurs – those in establishing a business. The study's findings showed that 195 efforts of starting businesses were successful while entrepreneurs abandoned 115 startup efforts. This study's findings showed that finances are one of the primary reasons why startups fail. Notably, a significant number of business startups start operations with small capital through founders. As a result, businesses' inability to meet their financial needs leads to their failure during their initial phases of operations. Likewise, many startups rely on capital derived through loans obtained in banks. Some of these sources of capital tend to be risky for startups as they command significant interests.

Again, Altman (1983) study observed that money market and credit conditions influence business failures. Mainly, money and the availability of credit and its cost is a potential source of business failure. Notably, the typical chain of events that lead to

business failure starts with operation challenges that manifest themselves through losses and deterioration of market share. High financial and operating leverage structures always augment the vulnerability of firms, including startups. Given that capital markets are not available to businesses whose solvency is threatened or those that have just started to operate, and suppliers are reluctant to increase their exposure, the primary source of credit is commercial banks. Irrespective of how poorly a business is performing, it is unlikely to declare bankruptcy so long as credit is available, and liquidity is sufficient. Therefore, it is obvious that businesses' propensity to fail during periods of economic stress when commercial banks employ relatively tight credit conditions is high vis-a-vis periods of economic boom when commercial banks employ relatively easy credit conditions.

Bruno et al. (1987) conducted a study to determine why businesses fail. The study findings showed that small businesses, including startups, fail because of financial and management reasons. Again, the study showed startups tend to fail because they cannot deal with crucial contingencies that threaten their survival. Startups fail in this case because they constitute the weakest firms.

In his study, Orkiszewski (2012) explored the attitudes that entrepreneurs have when they fail in their technology ventures. Notably, the author observed that entrepreneurs develop high-tech startups in uncertain environment conditions with technologies that are not proven and with inadequate resources. As such, a significant number of these ventures fail. Orkiszewski (2012) examined how entrepreneurs' attitudes to failure in high-tech startups vary in different locations – Silicon Valley (US), Germany (Munich), and Cambridge (UK) and they might show about entrepreneurial learning and identification of opportunities. The findings of the study revealed that entrepreneurial attitudes towards high-tech startup failures differ in the three locations. Germany seems to show substantially different attitudes than that of the UK and the US. Again, the findings showed that failure and setback play an important role in entrepreneurial experience.

Further, Ooghe & De Prijcker's (2008) study identified low cash flow and profitability as another cause of startup failures. These financial indicators of distress cause liquidity problems. Mainly, low cash flow and profitability are associated with bad investment decisions. Again, mistrust between investment and the management of startups leads

to the absence of external legitimacy. In such situations, investors withdraw their financial support to startup projects. Another financial-related problem that causes startup failures is the banks' refusal to cooperate with these entities' management. Notably, startups without a substantial amount of starting capital have little chance to survive. As such, initial undercapitalization marks the start of failure among many startups.

Cressy (2006) conducted a study to determine why startups fail in their early phases of operation. Specifically, the authors developed a model to explain why startups died in their first years of operation. The study's findings showed firms failed in their first years of trading because of the depletion of initial financial resources due to trading losses and bad luck. Another reason for startup failures was the absence of managerial human capital or talented entrepreneurs to propel their startups to grow faster. In other words, the study showed that many startups tend to start with low human capital that comprises the wrong combination or lack of diversity. As such, these issues make these firms fail early in their operations.

## 2.5 Impact of Failure on Businesses and Entrepreneurs

Yamakawa & Cardon (2014) carried out a study on causal attributions and apparent learning from entrepreneurship failure. The authors acknowledged that entrepreneurship is about success and failure, given that failed attempts or intentions to start new ventures to determine subsequent ones' success. The study's findings revealed that failure enables entrepreneurs to expand their knowledge and perspective about doing business, reverse their previous ineffective practices, and reveal mistakes. In other words, the results of the study revealed that internal, unstable failure attributions relate to greater perceived learning. However, external stable ascriptions lead to less apparent learning. Again, the study showed that entrepreneurs who start their ventures immediately after their previous one failed to enhance their ability for perceived learning. In this regard, the high-tech startup's failures are a precursor to future startups' success as founders learn through their mistakes.

Sarasvathy & Menon (2013) conducted a study that aimed at showing the relationship between the failure of firms and the success of entrepreneurs. Notably, the authors observed that perceived learning's performance augments the ability to succeed in the ventures. In most cases, many entrepreneurs record failures in their startups before they achieve success in subsequent ventures. They learn how to operate successful businesses through failure experiences. Therefore, habitual entrepreneurs tend to accumulate knowledge about their suppliers, customers, a network of contacts, and market-specific information. In many startups, this information is not available to entrepreneurs. In turn, this situation increases the chance of startups failing in their first years of operation.

Stayton (2015) addressed the pitfalls of starting startups quickly. In other words, this study sought to demonstrate that one cause of startup failures is starting them within a short period. In particular, the author argued that the emergence of organizations and innovative products in rapid succession is a complicated Endeavour requiring efforts from different fields such as entrepreneurship, innovation, law, public policy, psychology, management, and organizational behavior. The findings of this study showed that forming an organization very quickly might lead to some problems. Notably, the results showed that forming organizations very quickly compress the period of venture launch. In turn, this phenomenon leads to the elimination of some important activities or conducting them quickly. Overall, the left-out activities such as financial management, human resource organization, and marketing initiatives are likely to influence startups' survival or failure in the future.

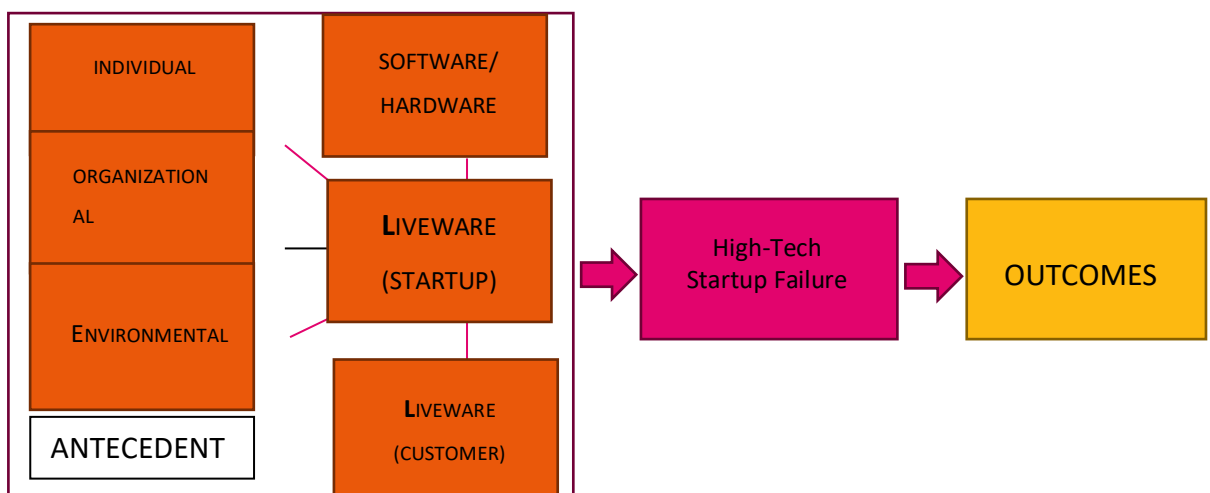
In retrospect, the following themes have emerged as common among startup failures. For instance, failures are caused by different factors that affect the way the startups perform and achieve their objective of making an impact on society. Likewise, the review of literature showed that organizational, environmental, and human factors play important roles in creating the antecedents to a startup failure. Despite the similarities in the characteristics of startups within the same context, the combination of different factors makes the development of the context of failure different for every type of startup. Overall, these common themes gathered from the review of literature form the foundation of the current study and provide the framework for its construct.



## 2.6 Theoretical Framework

The SHELL model has four components, namely Software, Hardware, Environment, Liveware People, and Liveware Environment that comprise the foundation for human factor studies in the aviation industry. It is a conceptual model developed by Hawkins in 1975, that was in turn based on the work of Elwyn Edwards in 1972, that provides a framework for analyzing the relationship between human factors and the resources of the aviation system (Dumitru & Boşcoianu, 2015). As the model adopts a systems perspective that considers how different human interactions with contextual and task-related factors affect their performance, it focuses on the active and latent features of aviation system failure. In this regard, the research will utilize this model to analyze the failure of high-tech startups, explore the different factors that contribute to failure and provide recommendations on future research.

In analyzing the antecedents and outcomes of a high-tech startup failure, the SHELL model provides a framework to address how the startup has progressed and developed new ventures considering the failure and how the previous failures of the startup have affected how decisions were made to arrive at the outcomes such as a new business venture. In this paper, an adaptation of the SHELL model was used to come up with the following theoretical framework.



**Figure 1.** The conceptual and theoretical framework of the antecedent and outcomes of a high-tech startup failure

Figure 1 shows the antecedents and outcomes of a high-tech startup failure. The Antecedent to the high-tech startup failure consists of elements of the SHELL model. The Software in this framework refers to the intangible and nonphysical component of the startup that can affect the performance of a high-tech startup. The Software provides the rationale for an organization to create, deliver, and add value to its desired market. This includes having a business model, startup positioning in the market, product-market fit, and product vision. Hardware is the tangible and physical component of a startup and refers to the product factor that includes focusing on the product, feasibility, quality, and product evolution in the market. The Environment refers to the physical component of the startup that defines where it operates, which includes the effects of competition, economical, and political situations on the startup. Liveware refers to the human components of the startup and is divided into customers and central liveware. This component considers the performance, organization, capabilities, and limitations of the human factor. The first Liveware refers to the customer or ends user factors such as customer satisfaction, cost of acquiring customers, and customer needs and expectations. Central Liveware refers to the startup organizational factors such as management skills, the competence of people, business organization, and finance. The interactions of these components determine the occurrence of a failure in a high-tech startup, specifically the interactions between the human factors and the other components. The outcomes of a high-tech startup failure may lead to a behavioral change towards decision-making or new business ventures. Thus, with this framework, the study aims to investigate the factors that contribute to Nordic high-tech startup failures and their outcomes. Specifically, the study aims to explore the outcomes in terms of the effects of the following components of the antecedent:

- The individual component (i.e., the human factor such as competence, skills, and limitations)
- The organizational component (i.e., management skills, planning, and risk assessment)
- The environmental component (i.e., relevant stakeholders, feasibility, market niche, and customer satisfaction)

Qualitative research was used in different studies of business failures such as Atsan (2016) and Forsberg & Mattsson (2006) to understand how businesses fail, especially how an individual develops within the context of a phenomenon. It is used to explain why things exist as they do, helping in the understanding of the events that lead to the outcomes. Therefore, in qualitative research, personal narratives and accounts are important to understanding the process under study. Thus, the current study used the qualitative method to gain insight into Nordic high-tech startups through a semi-structured interview with questions that aim to identify the antecedents and outcomes of failure.

The researcher used the theoretical framework as a foundation for developing an empirical study. It provided the researcher with insights into the studied phenomenon. Besides, the researcher used the theoretical framework to design the research methodology, develop research questions, and collect data. Moreover, the researcher used the theoretical framework as a foundation for thematically analyzing the data and discussing it based on previous study findings.

### **3. Research Methodology**

Since the discovery of the internet, the world and, particularly, Western countries have recorded an increased number of startups. Many high-tech startups have succeeded in becoming multinational companies, such as Facebook, PayPal, YouTube, and Uber. Likewise, a significant number of high-tech startups, such as Palm, AltaVista, Friends Reunited, Pebble, Vertu, Path, StumbleUpon, started as profitable businesses and ended up failing after a few years. Although numerous studies, such as Altman (1983), Atsan (2016), Kuckertz et al. (2020), and Van Gelderen et al. (2006), have focused on startup failures, most of them have not focused on a single industry or sector. For instance, Atsan (2016) studied the causes of business in various sectors, including automobile, logistics, supplier, construction, software, ceramic, iron, logistics, textile, and advertisement. Therefore, a review of high-tech startups' causes would explain why numerous new ventures operating in this sector continue to fail despite their promises.

### 3.1 Research Design

This study used a qualitative research method and, exploratory case, design to determine the primary causes of business failures among high-tech startups. A determination of the cause of high-tech startup failures would provide the government, high-tech startups, entrepreneurs, and other policymakers with insights on how to mitigate their failures. Using a qualitative research technique that uses exploratory case design will better understand the underlying studied phenomenon (Järvinen & Mik-Meyer, 2020; Yin, 2017). Likewise, the questions adopted in this research were aligned more to the qualitative research method. They were preceded by the adverb "what" so that it can warrant the use of the exploratory case study design.

Notably, the research design uses the SHELL model that focuses on the idea that humans are not the only root cause of any aviation accident. According to this model, other factors interact with the human, affecting their performance and contributing to the workplace's realization of accidents. In this regard, the model also considers operational failures, those that happen during process operations, and latent failures, those unobserved failures that remain hidden within the organization's structure (Dumitru & Boşcoianu, 2015). Moreover, due to the model's simplicity, it is commonly used in any study investigating accidents in the workplace and can be extended to related studies. In this regard, the study will utilize the model to investigate failures in high-tech startup companies. A questionnaire (Annex 1) based on the model was created and distributed to 15 high-tech startup companies with experienced operations failures. The researcher relied on the qualitative research method to analyze the data generated from interview. Interviews were designed to gain insight into high-tech startup companies in terms of their context as an organization, their risk management approaches, client focus, setting targets and objectives, and process management. These aspects of a business bring concrete outcomes of success if utilized to improve the operations.

The study focused on the causes of high-tech startup failures. As such, this study defined high-tech startups as business entities that rely heavily on technological innovation to provide products and services to their customers. In this regard, the

study included startups that use technological innovations, such as social media, smartphone and computer applications, online payment methods, and so forth. Mainly, the researcher accessed the startups for interviews from websites such as 500.co (n.d.) because they have information and links to thousands of startup companies spread across the world. Therefore, it is easier to identify and contact eligible study participants via 500.co network. Notably, the entrepreneurs were eligible to participate in the study if their high-tech startups had operated for at least three years. The sample size was 15 founders of high-tech startups.

### 3.2 Data Collection

The researcher conducted 15 interviews. Each interviewee was a founder or co-founder of a high-tech startup. Notably, the researcher chose interviewees using convenience sampling. In line with DiClemente et al. (2020) recommendation, the researcher relied on a readily available and existing group of individuals (founders or co-founders) of a high-tech startup and who were willing to participate in the interview. Besides, the researcher chose potential interviewees who knew the English Language, as interviews were conducted in that language. Specifically, the researcher searched for these interviewees in the LinkedIn database and requested them to participate in the interview. A request to participate in interviews was done through emails. Interviewees were hesitant on participating in the study, and hence they only accepted to participate in the study after the researcher assured them of the right to their confidentiality. Therefore, interviewees did not permit their names and other personal information, such as the name of high-tech startups to be released in the study.

Interviews were done through an online platform – Skype. The researcher used open-ended questionnaires to collect data. Before interviews, the researcher sent questionnaires to potential respondents – founders of high-tech startups who have operated for three years. In line with Agee's (2009) argument, the researcher used open-ended questions in this study to explore the studied phenomenon in depth. Therefore, these questionnaires constitute part of qualitative studies whose aim is to articulate what the researcher intends to know about the studied phenomenon's issues and perspectives. According to Agee (2009), the idea of qualitative inquiry acts

as a reflective process that underscores the strengths of a qualitative research method, given that it represents microscopic details of the studied phenomenon. In this way, the qualitative research method allows researchers to determine how they can clarify what is happening in the studied phenomenon. In line with Creswell (2013) and Lewis's (2015) observation, qualitative research questions use research questions that invite exploration and discovery. Mainly, the researcher collected the data from the founders of high-tech startups operating in the US, Finland, and Canada through written and recorded methods. Each interview took between 30 minutes and one hour. In some cases, interviewees did not want to spend a lot of time claiming their busy schedule.

Apart from interviews, the researcher used journal articles, conferences papers, and books as secondary sources of data. Some of these second sources of data included, but not limited to Altman (1983), Atsan (2016), Kuckertz et al. (2020), Bruno et al. (1987), González-Bañales & Andrade (2011), Schmuck and Benke's (2021), (Hassan, 2019), (2018a, 2018b), and Giardino et al. (2014). Mainly, the researcher used these secondary sources as complementary sources of data in both the literature review and discussion part. They helped the researcher to identify, define, and review the themes of the study.

The researcher labelled the founders of high-tech startups and their respective startups with pseudo names to mitigate privacy issues associated with data collection. In particular, the pseudo names entailed a combination of gender, age, and country initials. The pseudo names of study participants are included, and their demographics were presented in the table below.

**Table 1:** Characteristics of the Study Sample (n=15 Interviewees).

Pseudo Name	Gender	Age	Experience	Nationality and Initial
MALE27US	Male	27 Years	3 Years	United States (US)
MALE37US	Male	37 Years	6 Years	United States (US)
FEMALE35FI	Female	35 Years	5 Years	Finland (FI)
FEMALE33CA	Female	33 Years	4 Years	Canada (CA)
MALE44US	Male	44 Years	5 Years	United States (US)
MALE40US	Male	40 Years	5 Years	United States (US)
FEMALE41US	Female	41 Years	6 Years	United States (US)
MALE48FI	Male	48 Years	12 Years	Finland (FI)
MALE39CA	Male	39 Years	3 Years	Canada (CA)
FEMALE45CA	Female	45 Years	5 Years	Canada (CA)
MALE29US	Male	29 Years	4 Years	United States (US)
MALE26US	Male	26 Years	3 Years	United States (US)
MALE38FI	Male	38 Years	7 Years	Finland (FI)
MALE34CA	Male	34 Years	5 Years	Canada (CA)
FEMALE31US	Female	31 Years	6 Years	United States (US)

### 3.3 Data Analysis

In line with Williamson and Johanson's (2018) recommendation, the study used the cross-case synthesis technique and case study strategy to analyze the collected data. In particular, the study used thematic and narrative-based analysis of responses from 15 interviewed participants – founders and workers of high-tech startups. Mainly, the analytical approach combined both thematic narrative analysis by Riessman (2007) and grounded theory from Corbin & Strauss (2014). Data analysis was based on written and recorded information to ensure that the interviewees' responses were within the context of their arguments. Based on the sequence of the SHELL Model-based questionnaire, numerous themes emerged from interviewees' responses.

Data analysis was done using numerous phases recommended by Lofgren (2013) to ascertain thematic accounts associated with high-tech startups' business failures. Notably, the first step was listening to the recorded interviews on numerous occasions

while noting important and interesting perspectives. The second step was coding and indexing – reviewing and labelling labelled important notes based on phrases, sections, words, or sections (Lofgren, 2013). In particular, the researcher coded data based on phrases and words because some interviewees emphasized them. Interviewees repeated them on numerous occasions. They were in line with concepts of high-tech startups' failures. Below are codes or themes that researcher identified from the collected data.

**Table 2:** Codes of the failures

Codes	
1. Small market size	6. Product timing difficulties
2. Initial undercapitalization	7. Product design problems
3. Debt burden	8. Improper selling strategy
4. Lack of competent teams	9. Distribution channels
5. Human errors	

Step three of Lofgren's (2013) process entailed putting codes together to form themes on the studied phenomenon – high-tech startup failures. The primary themes that emerged included *small market size, debt burden, human errors, product timing and design challenges, absence of competent teams, improper selling strategy and distribution channels, initial undercapitalization*. Step four entailed labeling each theme based on its importance to high-tech startup failures. Therefore, the data analysis from interviewees was presented via recognized themes, and these categories constituted the main results of the study. The sixth and final step was to discuss the findings, whereby interpretation of results was based on previous scientific and academic sources such as books and journal articles.

### 3.4 Validity and Reliability

Notably, "an account is valid or true if it accurately represents those features of the phenomena that it is intended to describe, explain or otherwise" (Cutcliffe & McKenna, 1999, p. 376). In this study, the researcher conducted both external validity tests on three classmates and faculty members. As Cassell (2012) recommended, the validity test sought to ascertain whether the study results meant sense beyond that of



participants. Likewise, as Hammersley (1992) argued, the external validity test showed that the findings would be credible and authentic. The research will focus on the experiences of interviewees – founders of high-tech startups.

Likewise, the researcher conducted reliability tests on the same three classmates and faculty members. The test was to ascertain the effectiveness of using Skype and other predetermined tools and data collection instruments. In line with Cassell's (2012) observation, the results revealed that the study's findings would be transferable to other contexts with varied or similar settings such as industries, participants, and settings. Moreover, the test showed consistency within and across the data from three classmates and faculty members through data similarity. In this way, these findings imply that three classmates and faculty members' questions were relevant to the studied phenomenon.

### 3.5 Ethics

The study was conducted based on the University's Research Ethics Policy regarding humans' participation and sensitive data treatment in research. In particular, the interviewer requested each interviewee to fill a consent form before participating in the interview. Besides, interviewees were informed about their right to withdraw at any given time or avoid answering questions. Likewise, the researcher withheld sensitive or personal information of interviewees other than education, genders, marital status, and age from this study.

## 4. Results

### 4.1 Product and Market Problems

#### 4.1.1 Product Timing Difficulties

Many high-tech startups tend to experience product-timing problems. In the high-tech industry, products become obsolete within a short period. Therefore, startups that introduce products late in the market end up failing. Likewise, high-tech startups that introduce products to the market prematurely before the market exists tend to fail.

Notably, many interviewees noted that bad timing is the primary source of failed startups. High-tech industry is very competitive and flooded with products and services. Hence, startups must ensure that they do not introduce their products and services in the market when it is too late. When this happens, it is hard to draw customers from competitors who introduced their products at the right moment. Below are some quotes that show that the late or early introduction of products and services in the market is detrimental to startups' operations.

***MALE37US:** Starting a high-tech firm that provides solutions to problems that do not exist already has been one of the main causes of startup failures. This situation implies that there is no market for startup products or services.*

***FEMALE41US:** Technology changes every day, and startups that introduce products in the market enjoy market leadership. Any new entrants who introduce products and services that already exist in the market fail because customers tend to stick with the ones they already know.*

Based on these quotes, high-tech startups must emphasize timing – when to launch their products in the market. Mainly, this is because when the market is not ready or is past its peak, even appropriate product design would not attract buyers. If you are not the pioneer or don't do better than rivals, it's hard to draw customers from competitors who introduced their products at the right moment.

#### 4.1.2 Product Design Problems

High-tech startups encounter numerous problems relating to product design and development. All 15 interviewees noted that many startups launch their operations with little knowledge of their products or services' effectiveness to the designated solutions. Many founders conceive ideas from scratch, which they later transform into products and services. Since products and services are created through learning processes, a significant number of them have design problems. Products with design problems culminate into many high-tech startups' failure because they do not have additional income sources. Besides that, some product designs tend to take a lot of time to actualize, and hence they become unattained within the planned period or allocated budget. In turn, such products or services increase the operating costs of

startups. Given that most high-tech startups are resource-constrained, a prolonged period of designing and perfecting products and services leads to their failure.

On the other hand, many high-tech startups endure delays in product design and development. In some cases, these high-tech startups can compromise some features. However, they can compromise the primary features of their products and services. As such, startups have to consider tradeoffs between delaying their products and services or launch substandard products in the market. In either way, high-tech startups facing such dilemmas tend to fail because delays enable competitors to occupy the market. At the same time, substandard products lead to the underperformance of a product in the market.

***MALE38FI:** Some of the products are made and designed before their time. For instance, live video and online streaming services were not efficient in 2007 and we were trying to give services over live stream, that was far way beyond our products. Hence, any high-tech startups that focused on areas that were beyond their time already fails in their initial stages of inception.*

Overall, interviewees believe that product design problems contribute significantly to the failure of high-tech startups. Product design problems tend to cause delays and increase operating costs. A combination of delays and increase operating costs compel some high startups to abandon their operations.

#### 4.1.3 Improper Selling Strategy/ Distribution Channels

Startups introduce their products in the market without having had proper or existing distribution channels. Mainly, this is because their products are new in the market. Many startups face challenges associated with distribution challenges and selling strategy because they do not yet know about their preferences, tastes, and reactions of customers. Startups find it hard to determine the appropriate marketing strategy for their products. They end up selling these products in the wrong markets. Also offering a small commission doesn't attract talented salespeople who generates good income source for the startup. In some cases, you will find that your salespersons do not pay attention to some of the products because they give them a smaller commission amount. As such, they are more than willing to ignore some clients who want products that yield little commission and vice versa. If such products constitute the backbone of

a startup's income, then it struggles or fails. However, a startup must also align its distribution and selling strategies. They cannot purport to sell a product without having the means to deliver it to the client. Many startups lack a selling strategy because they want to sell to everyone, and hence they end up putting more effort into market targets that want their products. This was the case for one of the interviewed startup that they invested heavily in products that target populations with little use of it and hence to low sales.

***FEMALE31US:** You will find startups selling expensive products through trade shows instead of direct sales. Notably, it is much easier to sell expensive products in direct sales than marketing through trade shows. In the end, startups end up selling very few products and eventually fail in the end. Again, these interviewees noted that sales representatives tend to face some challenges when selling products of high-tech startups.*

The time zone is also another issue when setting up the distribution channels and customer service both. More time zones need more people in the team.

***FEMALE35FI:** To attract customers, some high-tech startups (like ours) provide potential clients with trial services and products. Once the trial period ends, high-tech startups lose most of these potential clients despite having spent a substantial number of resources. Such situations lead to high-tech startups failures. Another problem was that time zones relating to deals with Mexico, Malaysia, and Spain.*

Overall, these quotes from interviews show that startups' inability to reach out to appropriate clients through sales and distribution strategy culminates into low sales. In some cases, these low sales make startups end their operations due to losses and other forms of financial problems.

#### 4.1.4 Small Market Size

All interviewees noted that many startups rely heavily on a small number of customers. As such, any changes in the arrangement between these customers and startups lead to the latter's failure. Income and revenue generations in high-tech startups are very slow due to reliance on a few customers. This problem affects high-tech startups cash flow and forecast as well. Also, the overreliance of few customers limits the ability of high-tech startups to expand quickly. Notably, the income generated from these is considered constant. As such, some startups are held back to

operating at the same capacity for some time. Eventually, once these customers stop procuring from these startups, they end up collapsing. That condition doesn't change even when it comes to the governmental purchase order. Many startups that sell their products to one client like the government. Once the priorities of the government change, then these startups are left without customers. As such, they collapse or change their operations.

Below are some of the quotes from the interviews that show the "dangers" of over-relying on a small number of customers.

**MALE39CA:** *High-tech startups begin with few customers, and they rely heavily on them to continue their operations. As such, when some of them withdraw from purchasing their products, these startups collapse.*

**FEMALE33CA:** *Some high-tech startups develop products and services that are only useful to a few customers, such as the government and non-governmental organizations. As such, these startups depend primarily on the demand of these few clients, and once they stop needing their products or services, the operations of these startups commend to an end.*

**MALE26US:** *High thestartups that focus on producing parts of products used exclusively by one or two customers pose a danger. This danger is because once one or two withdraw from purchasing such parts, that marks the startups' end.*

Like other businesses, therefore, a significant number of high-tech startups fail because they depend heavily on a few clients. The presence of few clients means that many startups struggle financially. When some or all clients stop consuming products or services, these startups collapse.

## 4.2 Financial Problems

### 4.2.1 Initial Undercapitalization

All interviewees acknowledged that many startups start their operations with few resources. Due to the high initial costs needed to design and develop products, some startups abandon their operations. A significant number of high-tech startups embark on introducing new products in the market. Mainly, the designing and development of these new products lead to high operational costs. Since many startups at early stages

are not making profits and are under-resourced, they are forced to shut down the business. Another issue for *some startups that they tend to have* financial troubles at the beginning of their operations if they do not attract a large pool of resources from investors. Likewise, these investors want to see financial gains quickly. As such, a struggle between working within the budget to make products and meeting investors' goals constrain startups' ability to operate. Undercapitalization creates a pressure from the investors side for startups. Therefore, many of them end up failing.

The quotes below try to link initial undercapitalization and startup failures.

**MALE29US:** *Startups need many resources to operate, but unfortunately, this is not the case. Startups incur sunk costs, which they can only recover if they start recording profits in the short-term. Since most of the startups cannot realize profits in the short-term, they stop.*

**FEMALE35FI:** *Many high-tech startups lack sufficient resources and perfect knowledge, which make them unable to high-quality products. In some cases, you realize that you are missing one or two resources to design high-quality products or services.*

**MALE44US:** *Many investors are not enthusiastic about investing in startups because of their vulnerability to failure. As such, many of them attract little resources. In cases where they are unable to finance their operation costs, they mostly end up shutting down.*

**MALE26US:** *In some startups, the cost of designing and developing products and services exceeds the revenues generated in the short term. As such, the undercapitalization of startups makes them unable to operate in the long term, and hence they close the business after some period.*

These quotes show that most high-tech startups lack financial resources. High-tech startups needing many resources, however, only few investors are willing to provide resources to these ventures because of risks associated with them. As a result, most of them end up producing products and services that do not meet customers' expectations, or they fail to start their operations altogether.

#### 4.2.2 Debt Burden

All interviewees identified the burden of debt among high-tech startups as a major cause of their failure. Mainly, they noted that the inability of high-tech startups to pay loans and interests is one reason they fail. Some founders rely on bank loans to

actualize their dreams and ideas. They borrow money in anticipation that their ideas will be successful in both the short run and long run. However, many startup ideas take time before startup founders can realize financial benefits. The high-tech startups that find themselves unable to service their loans end up shutting down their operations. Borrowing resources and taking loans is part and parcel of many founders of startups. In most cases, they approach banks and other financial institutions with ideas with the sole goal of convincing the banks why they should give loans. However, some of these ideas fail altogether. As such, the pressure from creditors compels founders to shut down their startups.

***MALE38FI:** Most high-tech startups, like ours, are built using borrowed money, and hence the accumulation of debts leads to their inability to pay them.*

***MALE26US:** A lot of entrepreneurs use debt financing to fund their startups. In turn, many of them become unable to meet repayment provisions. Inability to repay debt causes other problems to startups, such as ineligibility to borrow more funds. Eventually, these financial situations lead to high-tech startup failures.*

***MALE34CA:** Loans and forms of borrowings constitute a large part of the capital that startups use to fund their operations. The burden of these borrowings arises when startups begin to repay the loans. If high-tech startups are unable to finance the debt, they simply discontinue their operations.*

These quotes also shows that many high-tech startups use loans and other forms of borrowing to finance their operations. The loans hit hard startups when they fail to succeed in the market. In extreme cases, these debt burdens lead to the closure of startups.

## 4.3 Managerial Problems

### 4.3.1 Lack of Competent Teams

Among the interviewees that they launched high-tech startups without knowledge or experience of operating businesses. As such, they end up making mistakes that lead to the failure of their startups. They also have had a lack qualified management teams and support from primary workers and consultants. The absence of qualified personnel and consultants makes founders of high-tech startup firms vulnerable to making

mistakes relating to financial management and product development. In return, some of these mistakes lead to the closure of businesses. Besides that, some of the high-tech startups lacking measuring the satisfaction of their customers. As such, they ignore customers' feedback, which in turn leads to their withdrawal from consuming high-tech startups products and services. Overall, the situation causes the failure of high-tech startups.

Below are some of the interview quotes that associated a lack of experience and business knowledge with startup failures.

***MALE37US:** Many startup founders do not understand the strengths and weaknesses of their entities. As such, they fail to capitalize on their startup strengths and compensate for their weaknesses. If some of these mistakes are ignored, like management of human resources and finances, they lead to these startups' mismanagement and bankruptcy.*

Here is another fine example of how workload balance management affects between the founders which creates a lack of competent teams.

***MALE48FI:** Founders of high-tech startups tend to engage in fighting because they are not satisfied with the work or contribution of one another. Some cofounders feel dissatisfied because they made judgments or signed contracts relating to shareholder agreements with their partners who did not honour them at the end.*

Hiring a no liable friends or relatives is also an issue for some startups. Talent comes first.

***FEMALE33CA:** Some founders of high-tech startups tend to hire their friends and relatives to manage and run them. Most of these friends and relatives lack the qualifications to manage businesses. As such, these individuals end up making conscious and unconscious mistakes that make these startups struggle to operate and other cases collapse.*

These quotes show that a significant number of high-tech startups do not have competent teams. Entrepreneurs, as team partners, found these technology-based startups. Most of these entrepreneurs do not have sufficient knowledge or experience to conduct some tasks in businesses, such as designing products or creating distribution channels. Therefore, these incompetent teams end up making bad



decisions that lead to the failure of their high-tech startups. In a different vein, the founders of high-tech startups tend to hire incompetent professionals. Notably, some professionals such as secretaries and lawyers fail to read some sections of contracts that come to haunt startup operations. For instance, professionals' inability to read loan provisions tends to burden startups, and extreme cases lead to bankruptcy.

#### 4.3.2 Human Errors

Interviewees in this study identified human errors as some of the causes of business failures. Human errors are very common in startups, given that founders and employees operate through the learning process – they develop and try ideas such as product features from scratch to see if they would achieve their intended solutions. Due to a lack of experience in doing businesses, some entrepreneurs fail to transform their ideas into successful businesses. As such, some of these businesses ended up failures in the early stages of their inception. Likewise, most high-tech startups do not have measuring or monitoring tools. As such, high-tech startups end up having an unmet target. Mainly, this problem occurs because high-tech startups must start their ideas, collect data on them to gain some facts to validate them. In other words, high-tech startups must collect data from customers, which in most cases they do not, to align their ideas with their (clients) needs. On the other hands, founders take time to learn how to perfect their ideas. Before that happens, these startups founders and personnel make numerous errors like hiring unqualified people, mismanaging funds, and having no defined business objective. These errors lead to the use of resources inappropriately and, in extreme cases, their exhaustion.

Below are some of the quotes that links human errors with business failures.

**MALE29US:** *Human beings run startups. These individuals rely on thrills and trials to operate startups. In their effort, human beings have expectations and stress. As such, these pressures tend to compel founders' personnel of startups to make decisions that turn to be mistakes and costly. Some mistakes lead to the closure of startups.*

**MALE26US:** *Even experienced entrepreneurs make mistakes. However, fresh starters of startups tend to make more and grave mistakes. For instance, they tend to invest in projects and products that turn out to be unfeasible. If such investments consume a lot of resources, many startups end up struggling to operate. Some of these startups go out of business.*

**MALE34CA:** *Human errors like those that we have noted in some high-tech startups operating in the electric car industry, many founders have ended up blowing millions of dollars without achieving any substantial ground. Notably, some of them have ended up collapsing or owners abandoning their dream startups.*

**FEMALE35F1:** *In the initial phases of high-tech startups operations, employees and founders working long – working 18 hours a day. In some cases, some workers perform different tasks at the same time. Thus, human errors are inevitable.*

These quotes show that operating startups is not a smooth run. Founders and personnel make mistakes and correct them on the way towards perfection. In some cases, these mistakes lead to the closure of startups if they lead to mismanagement of resources.

## 5. Discussion

Startup failures are associated with numerous factors. These factors may be categorized into financial challenges, product and market-related problems, and managerial mistakes. In this regard and as Altman (1983), Atsan (2016), Kuckertz et al. (2020), and Bruno et al. (1987) observed, the challenges of starting and running successful startups are becoming more complex and difficult due to the changes in technology, products, innovation processes, businesses regulations, and competitions. Notably, high-tech startups are some businesses that witness severe competition due to their products and services' short life. As such, more than 50% of startups end up failing due to these challenges. The findings of this study have revealed numerous factors that lead to the failure of startups. These factors include product timing difficulties, product design problems, improper or absence of selling strategy/ distribution channels, small market size, initial undercapitalization, debt burden, lack of competent teams, and human errors. The extent to which founders and personnel running high-tech startups encounter these factors determines their likelihood to fail.

### 5.1 Product Timing Difficulties

Product timing challenges are among the primary contributors to startup failures. This study's empirical and theoretical results have shown that many high-tech startup firms find it hard to launch their products and services at their appropriate time. These

findings support that of Bruno et al. (1987) that revealed that high-tech startup firms tend to bring products and services to the market too early or late. In other words, high-tech firms tend to launch products in the market when the market does not exist, or they are not ready to absorb them. Therefore, as Bruno et al. (1987) observed, early and late product entry into the market are primary causes of startup failures worldwide. Premature products mean that a high-tech startup is providing solutions to problems that do not exist. *Aria Insights* is an example of startup failure; it provided a solution to a problem that did not exist at the time – it developed driverless air vehicles for search, inspection, and rescue missions (Hassan, 2019). Therefore, the early introduction of products and services is problematic to startups.

Late product entry in the market is associated with high-tech startup failures through short product lives and severe competition. According to González-Bañales & Andrade (2011), businesses' long-term success is no longer tied to satisfying customers' goals. Long-term success is associated with the persistent need to acquire loyal and profitable clients. In this regard, late entrants have a slim chance of acquiring loyal and profitable customers. High-tech startups that enter the market late tend to fail because of their inability to acquire loyal and profitable customers. Notably, companies such as Facebook and Twitter have succeeded because they entered the social media market at the right time. The startups that entered the market late, such as Google Buzz, Meerkat, Friendster, and Google Plus, failed because customers had adopted to services and products that Facebook and Twitter offered. In line with Atsan (2016) and Bruno et al. (1987) argument, late entrants into markets find themselves acting as copiers of what already exists. Hence, the response of customers is very slow. In other words, late entry into the market made these startups unable to draw customers from existing companies that had introduced their products and services at the appropriate time. Overall, high-tech startups must emphasize the right time – launch products and services when their demand is at the peak.

## 5.2 Product Design Problems

Product design problems have a close relationship with timing – at what time should startups design and develop products in demand in the market. As the results of this study have revealed, and according to Bruno et al. (1987), many startups find it hard to

adhere to the planned product design or budget allocation. In this regard, these startups choose whether to bring a prototype to the market or design the product until they attain planned standards. Likewise, and as Giardino et al. (2014) observed, high-tech startups need to develop technologically innovative products that require cutting-edge development techniques and tools. Given that most of these high-tech startups do not have these technologies, they tend to take a longer period to develop products. Notably, these delays are hazardous to startups because they provide other firms competing in the same industry to have an upper edge in the market if they lack their products and services first. In line with Schmuck & Benke's (2021) observation, these product design delays tend to make startups be considered replicators rather than innovators. As such, clients will try to consume products and services that hit the market first.

Again, this study's findings have shown that product design problems that eventually lead to the failure of some high-tech startups are associated with the lack of knowledge and experience in their development. In line with Bruno et al. (1987) and Giardino et al. (2014) argument, the founders of high-tech startups build their products and services from scratch, and hence they develop them through a learning process: they learn and perfect their products and services through mistakes. These errors and corrections lead to delays and financial costs. In situations where mistakes made on products and services designing and development were resource consuming, high-tech startups are forced to abandon their operations. In a different vein, some product designs lead to creating products that do not solve the existing problem or are meant to solve problems that do not exist. An example of such product design was *uncrewed vehicles* that *Aria Insights* has introduced to conduct rescue missions (Hassan, 2019). As a result, *Aria Insights* failed because the market it targeted was very small or inexistent.

Moreover, this study's findings have revealed that some product design problems tend to compel founders and personnel of high-tech startups to compromise some of their features. These findings support Bruno et al. (1987) and Giardino et al. (2014) observation that many high-tech startups lack proper mechanisms and criteria for determining products or services' effectiveness to solve the underlying problems. They build a prototype of the product at a time and then improve it based on their

underlying weaknesses. In most cases, high-tech startups do not have sufficient resources. If product design and development are costly, some of these startups end up halting their operations. Likewise, if they choose to launch substandard products in the market, these high-tech startups end up underperforming in the market. Eventually, these firms fail due to low sales revenues. Overall, product design problems culminate into delays in launching products in the market and increase operating costs. The extreme cases of delays and increased operating costs compel some high-tech startups to go out of business.

### 5.3 Improper or Absence of Selling Strategy/ Distribution Channels

This study's findings have revealed that even the greatest products do not sell themselves if businesses or their developers do not have distribution channels or selling strategies. Notably, these results are in line with studies done in the past that associate startup failures with improper or absence of a lack of selling strategies and distribution channels. Bruno et al. (1987) and Huffman (2018a, 2018b) observe that many startup founders tend to make mistakes by assuming their products will sell themselves. These studies associated poor distribution channels as the primary cause of startup failure. According to Huffman (2018a, 2018b), many startup founders start with their enthusiasm about having the best idea ever. Still, later they become surprised why people are not using it, and eventually, they come to think that their product is not that great. However, the startup's product is not bad, but the distribution channel is the problem (Huffman, 2018a, 2018b). In other words, the use of improper distribution channels meant that the startup was unable to reach out to the targeted market. As such, the startup is unable to realize instant user growth of the product or service.

According to Huffman (2018a, 2018b), the best product does not always attract customers. This observation explains why some startups with the best products fail. Therefore, only products that satisfy the appropriate market attracts customers. Notably, this is achieved when founders and personnel running startups align their growth strategy with the actual product (Bruno et al., 1987; Huffman, 2018a, 2018b). In other words, founders and personnel running startups must always connect their products to their potential users in the right manner. When distribution plans in

startups are not thought well or take the wrong path, such entities fail in the long term. An example of using the wrong path of distribution channel is a failure to get products in front of the appropriate consumers or inhibit sellers' ability to get the feedback they need (Huffman, 2018a, 2018b). For instance, some high-tech startups tend to sell expensive products through inappropriate distribution channels such as trade shows instead of direct sales. Notably, and as Bruno et al. (1987) observed, it is much easier to sell expensive products in direct sales than marketing through trade shows. Therefore, high-tech startups' failure is not associated with the tactics that founders use but the approach and process that impair them from finding out the appropriate way to align their product with the ideal consumers.

Proper distribution channels mean having a strategy that promotes sustainable growth. Most startups are more focused on the product itself at the expense of paying attention to the marketing strategies and distribution channels they intend to use to reach out to the intended customers. In this way, and as Huffman (2018a, 2018b) observed, these startups fail to market their products to customers who want to purchase them. In the end, these errors lead to startups' inability to record instant growth in the market. In turn, low sales and losses because of improper distribution strategies and channels lead to many startups' failure. Mainly, this is because, inappropriate distribution strategy fails to the product (solution) to the people who have the need (problem) in a precise manner (Bruno et al., 1987; Huffman, 2018a, 2018b). Overall, the use of wrong distribution channels leads to businesses' failure (including high-tech startups) through low sales and losses.

#### 5.4 Small Market Size

The study results have shown that many high-tech startups suffer from a few or one "big customer" trap. In particular, and as Bruno et al. (1987) argued, most high-tech startups manage to get few customers they depend heavily on to survive. In other words, these customers are the only source of income in that when one or two stops consuming the high-tech startup products or services, that venture eventually collapses. Again, some high-tech startups tend to develop products and services that are useful to a few customers. For instance, high-tech startups building artificial intelligence sell it to one or two big companies or entities such as Tesla, Amazon, or

the government. In such situations, and according to Bruno et al. (1987), such high-tech startups' operations are pegged on this relationship. Therefore, customers' withdrawal from the arrangement leads to the collapse of these high-tech startups because they cannot sustain their operations.

Again, high-tech startups find it hard to attract customers to purchase their products. Initially, and according to Giardino et al. (2014), many high-tech startups tend to receive positive feeding at the beginning from customers. With time, however, it becomes clear that startups can only acquire and depend heavily on a small number of customers. Given that most high-tech startups operate on a low budget and are still learning how to design their products and sell them in the market, they tend to avoid analyzing why they are getting fewer clients. In cases where they analyze why they are getting fewer users, they establish that the main causes are challenges associated with the use of their products and marketing strategies (Giardino et al., 2014). Notably, a few or one client's overreliance constraints high-tech startups' ability to expand their operations. In cases where high-tech startups are not making profits due to few customers' presences, they go out of business. Overall, the overdependence on a few customers tends to cause many startups to collapse.

## 5.5 Initial Undercapitalization

The findings of this study revealed that most high-tech startups are in critical need of initial funding to operate smoothly. In line with Giardino et al. (2014) observation, high-tech startups tend to experience financial challenges, especially when operating in small cities. Again, startups tend to be undercapitalized because few people want to invest in high-tech startups that lack clear-cut products or business plans. Giardino et al. (2014) believe that financial challenges are widely spread in high-tech startups. The undercapitalization in high-tech startups prevents them from creating, change, revolutionize products and services, which is a prerequisite of success in technology-based industries. The inability to create, change, revolutionize products and services means that high-tech startups' products and services become obsolete within a short period. Consequently, the high-tech startups end shutting down as customers shift to other similar product and service providers.

Again, the study findings revealed that some startups need many resources to design and develop their products and market them. On the contrary, and as Bruno et al. (1987) and Volquartz & Neumann (2016) observed, many investors tend to shun high-tech startups because of the risk associated with the inability to recover the investment. Mainly, many high-tech startups embark on introducing new products in the market which risk-averse investors are uncertain whether they will be successful. As such, most high-tech startups must start making profits in a short period of their operations to recover sunk costs and continue funding their operations. In case it becomes impossible to generate income in the short-term, then high-tech startups end up abandoning their operations.

Likewise, according to Bruno et al. (1987) and Volquartz & Neumann (2016), some high-tech startups tend to have financial troubles at the start of their operations. Investors who put their money in these high-tech startups want to see their financial returns in the short-term. Therefore, high-tech startups find themselves in a dilemma of pleasing their investors or funding their projects with generated income. If they choose to please their investors, high-tech startups end up producing substandard products and services. As a result, customers shun these high-tech startups, and eventually, they collapse. On the other hand, if these high-tech startups choose to fund their projects with generated income, investors decline to fund other operations. As such, these financial constraints force some high-tech startups to fail.

Moreover, according to Kiehl (1988), inadequate capital constitutes one of the main reasons why new ventures collapse. Undercapitalization contributes to failure because founders of high-tech startups have to spend a lot of time seeking funds to offset short-term cash flow challenges. In this regard, undercapitalization creates two forms of problems. First, many investors avoid investing in high-tech startups that are in financial crisis. Second, the undercapitalized high-tech startups tend to lose the sense of focus because of the loss of the main objective (Bruno et al., 1987; Kiehl, 1988). In other words, high-tech startup founders and personnel shift their focus from product design and development to worrying about the sources of capital. In some cases, these financial problems lead to the failure of high-tech startups.



## 5.6 Debt Burden

The results of this study have revealed that assuming debt at the start of high-tech startups poses a primary threat to the survival of these business entities. These findings support the arguments of studies such as Bruno et al. (1987) that have demonstrated that obtain debt financing early is problematic to high-tech startup operations. Debt financing subjects high-tech startups to early repayment of debt. Notably, most high-tech startups fail to meet debt repayment requirements because they are still making losses or generating sufficient income to cover their operating costs in the early phases of their development. Therefore, the inclusion of debt burden in the early phases of high-tech startups' operations disrupts their operations, and some cases lead to their closure.

A study done by Cole & Sokolyk (2014) contradicts this study's findings on the impact of debt financing on high-tech startups. Cole & Sokolyk's (2014) study findings revealed that firms that obtain bank credit in the name of their businesses (business bank credit) at the beginning of their operations tend to outperform other firms regarding revenue growth and business survival. In other words, the findings of this study showed that businesses that seek external financing have a better chance of succeeding than others that finance their operations using equity and personal savings. Notably, Cole & Sokolyk (2014) offer three explanations that could explain the superior performance outcomes of startups seeking debt financing. These explanations include "self-selection by high-quality firms to apply for business bank credit to signal the firm's quality and initiate credit record and reputation building, selection of high-quality firms by bank lenders, and monitoring by lenders" (Cole & Sokolyk, 2014, p. 22). One of these explanations implies that banks will only lend their money to high-tech startups that show a promising future. These approaches leave other high-tech startups without resources to fund their operations. Another explanation is that only high-tech startups that feel that their products will be successful in the market choose to seek debt financing from banks and other financial institutions. As such, the rest of the high-tech startups are left with no alternative but to operate under financial constraints that result in their failure.

## 5.7 Lack of Competent Teams

The findings that lack of competent teams in high-tech startups are in line with previous studies that have revealed that they lead to business failures. Giardino et al. (2014) provide a wide range of incompetence in teams working in high-tech startups that lead to their failures. For instance, many high-tech startups fail to organize well or motivate their teams. In some cases, their composition of teams comprises friends and relatives who lack qualifications for their position. In other cases, there is a breakdown of communication between entrepreneurial teams. For example, and as Giardino et al. (2014) illustrated, failure to update important stakeholders such as consultants and outsourced product developers compels them to leave their current positions and take assignments from other firms. Such situations take high-tech startups to the initial stages because new personnel will need to review everything that had been achieved and then make recommendations where necessary. Therefore, this processing is time and resource-consuming in that it could lead to the failure of high-tech startups.

Another lack of competent teams in high-tech startups is exemplified by the lack of diversity in their team. In most cases, and as Giardino et al. (2014) observed, many high-tech startups will constitute workers who perform the same tasks. For instance, these high-tech startups building computer software and applications hire workers who are computer scientists. In this way, they forget that building computer software and applications is part of the business, and hence they need sales and marketers, accountants, managers, and so forth. In this regard, such high-tech startups will be forced to have some of their computer scientists perform these tasks – selling, marketing, and managing finances – which they have little or no knowledge about. In this case, and inline with Huffman's (2018a, 2018b) observation, such high-tech startups might have the perfect product but still, fail because they target the wrong consumers. Likewise, computer scientists managing these high-tech startups' financial resources are likely to mismanage them and hence lead to their collapse or failure.

Another lack of competent teams in high-tech startups relates to the hiring of unqualified individuals. In line with Bruno et al. (1987) observations, most high-tech startups hire few and cheap workers because of their budget constraints. As such, most of these workers are overburdened by the activities in their respective position of

work. For instance, and as Giardino et al. (2014) observed, some workers will be in charge of product design and development, marketing, and financial management. Doing so many tasks simultaneously, and hence workers are likely to make mistakes that will cost the high-tech startups a lot of money. For instance, if lawyers and secretaries of these high-tech startups fail to read some sections of contracts, their actions will likely come to haunt the business operations. If these sections of contracts have financial implications, the high-tech startups may end up collapsing.

## 5.8 Human Errors

This study's findings have shown that some human errors are responsible for the failure of high-tech startups. These findings affirm previous studies on the same subject. For instance, Bruno et al. (1987) and Giardino et al. (2014) observed that founders and employees in high-tech startups learn through their actions. They develop their products and services through try and error methods until they achieve the intended results. Mainly, the lack of prior knowledge is risky to high-tech startups' resources. Some investment decisions in products and services in high-tech startups do not yield financial benefits. Consequently, such investments compel some high-tech startups to shut down.

Again, many founders of startups begin them as a side hustle, and hence they work in them as part-time employees. Employees working part-time do not have much time to review and scrutinize everything. For instance, and as Giardino et al. (2014) observed, these founders do not have time to conduct interviews, review financial usage, review employees' performance, and so forth. These aspects constitute mistakes or failures that founders of high-tech startups make. Their actions hinder them from knowing when a problem such as financial mismanagement starts. They realize these problems when it is too late to change the course.

Another common human error in high-tech startups relates to founders' inability to foster self-discipline among their teams. According to Giardino et al. (2014), "staying focused and disciplined is not easy for [high-tech startups]" given that a significant number of members are less focused and self-disciplined (p. 8). Many founders tend to dedicate little time to the projects – product design and development – because of

personal commitments or other jobs. As such, these actions demoralize other teams and leads to low productivity. Likewise, and Giardino et al. (2014), when high-tech startup founders lack physical touch with their businesses, a declined coordination among team members and lack of discipline becomes major issues. Since high-tech startups have small teams, it is important for all individuals – workers and founders – to contribute to the businesses' operations. In case founders lag, workers follow suit, and in the end, the high-tech startups fail.

Moreover, another human error that leads to high-tech startups' failure relates to actions prompted by unreasonable expectations. According to Bruno et al. (1987), high-tech startup founders and employees tend to fall into the trappings of former success. As a result, many of these founders and employees find themselves being caught up in the excitement of running a business and hence losing sight of what they need to do to achieve the desired success. For instance, high-tech startups, founders, and employees may start by moving to big fancy buildings and recruiting a large staff in anticipation that their businesses will succeed. These mistakes may mark the downfall of high-tech startups as they attract increasing operating costs. Therefore, human errors that attract high financial costs are likely to lead to high-tech startups' failure.

## **6. Conclusion and Recommendations**

### **6.1 Conclusion**

The primary theoretical contribution of the master thesis to ascertain the principal causes of high-tech startup failures. Mainly, the study used data collected from 15 high-tech startups operating in the US, Finland, and Canada and that have been in operation for at least three years. Using a SHELL Model-based questionnaire, the researcher managed to obtain three common themes – management problems, financial challenges, and product and market issues – that interviewees associated with high-tech startup failure. The study results provided a better understanding of how these themes contribute to high-tech startups' failures. Notably, the researcher did this through a profound review of subthemes such as product timing difficulties, product design problems, improper or absence of selling strategy/ distribution channels, small market size, initial undercapitalization, debt burden, lack of competent

teams, and human errors. For instance, the study revealed that many high-tech startups depend on few customers (small market size), and hence they end up a failure if some of them decide to stop purchasing their products and services. Likewise, the results showed that many high-tech startups lack selling strategies and distribution channels, and therefore they end up attracting few or no customers for their products and services. Moreover, the study has identified human mistakes as another frontier through which high-tech startups are likely to fail. Overall, the study results showed that numerous factors are likely to contribute to high-tech startups' failure.

## 6.2. Managerial Implications

This master thesis aims to help founders and entrepreneurs to establish and manage high-tech startups into successful entities. Its potential contribution is assisting high-tech startups and policymakers in understanding the primary cause of new ventures' failures. Notably, the study provides insights into finance, management, market, and product – where founders and personnel working in high-tech startups should watch out as antecedents of failures. Initial undercapitalization and debt burden will impede high-tech startups from designing and developing appropriate products and services and impair them from expanding their operations.

The framework provided in this master thesis implies that the establishment and operation of high-tech startups are complex endeavours that call for internal and external actions for them to become successful. Related to this argument, starting and operating high-tech startups is not the role of founders and entrepreneurs alone, but inclusive of other professionals, such as financial managers, human resources managers, product designers and developers, marketers and salespersons, and so forth. These professionals play a crucial role in the successful launch and operation of high-tech startups in numerous frontiers. For instance, product designers and designers have the responsibility of defining and formulating product attributes, creating print and digital drawing, and designing operational products and services.

Moreover, human resources managers have the responsibility of hiring and motivating workers, as well as supporting technology and innovation areas of high-tech startups. Notably, human resources managers' support is through recruiting competent and

desired product designers and developers. Hiring competent product designers and developers in high-tech startups mitigates human errors and their associated financial costs relating to product and service design and development. Financial managers are responsible for the resources of high-tech startups. High-tech startups tend to have fewer resources; hence, financial managers must ensure that these resources are used optimally by deploying financial management policies that promote efficiency in high-tech startups. Finally, marketers and salespersons are responsible for ensuring that high-tech startups launch products in the market at the appropriate time – not too early or too late – to realize a substantial growth in sales.

### 6.3 Implications for Research

From a theoretical perspective, this thesis contributes to various areas of research. For instance, the study results reveal that numerous factors such as product and market challenges (product timing difficulties, product design problems, improper or absence of selling strategy/ distribution channels, and small market size) lead to the failure of high-tech startups. Financial problems (initial undercapitalization and debt burden) and management issues (lack of competent teams and human errors) are other factors that lead to the failure of high-tech startups. For instance, the absence of competent teams in high-tech startups tends to lead to mismanage of resources that eventually cause their demise. Second, the study results show that the failure of high-tech startups may stem from a combination of several factors. For example, a combination of product design problems and initial undercapitalization may lead to high-tech startups' failure. Therefore, this study contributes to literature relating to the causes of high-tech startup failures.

### 6.4 Limitations of the Research

Consistent with Greener's (2018) and Price & Murnan's (2004) observation, another limitation was that the researcher was not able to identify any systematic bias relating to the study design or instrument of data collection. Notably, systematic biased could have led to unintended effects on the results.

Another methodological limitation relating to intervening the founders of high-tech start-ups. Notably, prior literature, such as Greener's (2018) and Price & Murnan's (2004) recommended, interviews to take about one hour. However, this period was not sufficient for in-depth interviews.

Again, the study's use of founders of high-tech startups as participants of the study raised another methodological limitation. In particular, and as Greener (2018) and Price & Murnan (2004) noted, some founders of high-tech startups may have been untruthful about the cause of high-tech startups failures or overstated their experienced with studied phenomenon, or even guessed their responses. In this regard, many high-tech startups founders may have failed to reveal factual information about high-tech startups failures.

Further, the study relied exclusively on high-tech startups founders. As such, it ignored views of other important stakeholders, such as potential customers of products, workers, investors, and creditors.

The study reviewed high-tech startup failures in general, without paying attention to a particular area – finance, products and markets, and management. Notably, focusing on each area meant that the researcher left little room to conduct profound research on each element.

This study used a sample of 15 founders of high-tech startups from three countries along – the US, Finland, and Canada. Researchers, policymakers, and startup founders cannot use the sample to gain insights into high-tech startup failures in other countries.

## 6.5 Recommendation for Research

This study has introduced a new perspective of research relating to high-tech startup failures. A substantial amount of literature exists about startup failures. Before this study, researchers had not conducted considerable research that exclusively focused on failures in high-tech startups. Mainly, most previous studies paid attention to a failure in general – in all sectors. In this regard, future research should expand on this area through studies that focus on high-tech startup failures in one subsector, such as e-commerce, healthcare, and agriculture. More specifically, future studies can focus on

high-tech startups operating in marketing areas such as marketing, fashion, payments, and so forth

Again, the study reviewed high-tech startups in general without paying attention to a particular area – finance, products and markets, and management. Notably, each of these areas has a high potential for causing high-tech startup failures. Therefore, future studies should focus on how each area – finance, products and markets, and management – influences high-tech startups' failure.

Moreover, this study used a sample of 15 founders of high-tech startups from three countries along – the US, Finland, and Canada. As such, future studies should use larger samples drawn from many countries across the world so that researchers can draw inferences for most of this population – founders of high-tech startups. Likewise, this study relied on a qualitative research method to analyze the collected data. As such, future studies should use quantitative data analysis methods to determine the extent to which the identified factors influence business failures.



## References

- 500.co. (n.d.). *500 Startups is more than just a name*. <https://500.co/startups?filter=1&region=US+-+Non+CA,LatAm,US+-+CA,Canada>
- Agee, J. (2009). Developing qualitative research questions: A reflective process. *International Journal of Qualitative Studies in Education*, 22(4), 431–447. <https://doi.org/10.1080/09518390902736512>
- Akter, B., & Iqbal, A. (2020). Failure factors of platform start-ups : A systematic literature review. *Nordic Journal of Media Management*, 1(3), 433–459. <https://doi.org/10.5278/njmm.2597-0445.6090>
- Altman, E. I. (1983). Why businesses fail. *Journal of Business Strategy*, 3(4), 15–21. <https://doi.org/10.1108/eb038985>
- Atsan, N. (2016). Failure experiences of entrepreneurs: Causes and Learning Outcomes. *Procedia - Social and Behavioral Sciences*, 235(October), 435–442. <https://doi.org/10.1016/j.sbspro.2016.11.054>
- Bednár, I. R., & Tarišková, I. N. (2017). Indicators of startup failure. *Industry 4.0*, 2, 276–278.
- Blank, S., & Dorf, B. (2012). *The startup owner's manual: The step-by-step guide for building a great company*. K & S Ranch, Inc. Publishers.
- Bruno, A. V., Leidecker, J. K., & Harder, J. W. (1987). Why firms fail. *Business Horizons*, 30(2), 50–58. [https://doi.org/10.1016/0007-6813\(87\)90009-7](https://doi.org/10.1016/0007-6813(87)90009-7)
- Bui, A. (2016). *Startup ecosystem in Finland*. <https://www.theseus.fi/handle/10024/120115>
- Cantamessa, M., & Gatteschi, V. (2018). Startups ' Roads to Failure. *Sustainability*, 10(2346), 1–19. <https://doi.org/10.3390/su10072346>
- Cassell, C. (2012, November). What is good qualitative research - presentation. *YouTube*. <https://www.youtube.com/watch?v=XbTFtoYRztc&t=6s>
- Cole, R. A., & Sokolyk, T. (2014). Debt Financing, Survival, and Growth of Start-Up Firms. *2014 Annual Meetings of the Financial Management*, 1–49. [https://www.researchgate.net/publication/266615427\\_Debt\\_Financing\\_Survival\\_and\\_Growth\\_of\\_Start-Up\\_Firms](https://www.researchgate.net/publication/266615427_Debt_Financing_Survival_and_Growth_of_Start-Up_Firms)
- Corbin, J., & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (4th ed.). SAGE Publications.

- Cressy, R. (2006). Why do most firms die young? *Small Business Economics*, 26(2), 103–116. <https://doi.org/10.1007/s11187-004-7813-9>
- Cutcliffe, J. R., & McKenna, H. P. (1999). Establishing the credibility of qualitative research findings: The plot thickens. *Journal of Advanced Nursing*, 30(2), 374–380.
- DiClemente, R. J., Crosby, R. A., & Salazar, L. F. (2020). *Essentials of public health research methods. In Diseases of the Chest*. Jones & Bartlett Learning.
- Dumitru, I. M., & Boşcoianu, M. (2015). Human factors contribution to aviation safety. *International Conference of Scientific Paper AFASES 2015*, 1–5.
- Forsberg, M., & Mattsson, N. (2006). *From business success to failure: A study of Swedish gazelle companies and their use of management accounting* [Goteborg University]. <https://gupea.ub.gu.se/bitstream/2077/1443/1/05-06-108.pdf>
- Gage, D. (2012). The venture capital secret: 3 out of 4 start-ups fail. *The Wall Street Journal (WSJ)*. <https://www.wsj.com/articles/SB10000872396390443720204578004980476429190>
- Giardino, C., Bajwa, S. S., & Wang, X. (2014). Key challenges in early-stage software startups key challenges in early-stage software startups. *International Conference of Software Business*, 27–41. <https://doi.org/10.1007/978-3-319-18612-2>
- González-Bañales, D. L., & Andrade, H. P. B. (2011). Exploring business competitiveness in high-technology sectors: An empirical analysis of the Mexican software industry. *Journal of Information Systems and Technology Management*, 8(2), 269–290. <https://doi.org/10.4301/s1807-17752011000200001>
- Google. (n.d.). *From the garage to the Googleplex*. <https://about.google/our-story/>
- Graham, P. (2012). *Startup = growth*. <http://www.paulgraham.com/growth.html>
- Greener, S. (2018). Research limitations: The need for honesty and common sense Sue Greener. *Interactive Learning Environments*, 26(5), 567–568. <https://doi.org/10.1080/10494820.2018.1486785>
- Griffin, J. M., Harris, J. H., Shu, T. A. O., Topaloglu, S., Falkenstein, E., French, K., Gallmeyer, M., Goetzmann, W., Hatheway, F., Hirshleifer, D., Ibbotson, R., Jagannathan, R., Jordan, S., Karceski, J., Kelly, P., Lakonishok, J., Leroy, S. F., Martin, S., Nardari, F., ... Starks, L. (2011). Who drove and burst the tech bubble? *The Journal of Finance*, LXVII(4), 1251–1290.
- Hammersley, M. (1992). What's wrong with ethnography? In *What's Wrong with*

*Ethnography?: Methodological Explorations*. Routledge.

<https://doi.org/10.4324/9781351038027>

Hasani, T., & O'Reilly, N. (2020). Analyzing antecedents affecting the organizational performance of start-up businesses. *Journal of Entrepreneurship in Emerging Economies*, 13(1), 107–130. <https://doi.org/10.1108/JEEE-08-2019-0116>

<https://doi.org/10.1108/JEEE-08-2019-0116>

Hassan, A. (2019, December 23). Top 10 startup failures of 2019. *The Startup*.

<https://medium.com/swlh/top-10-startup-failures-of-2019-375b4605ee73>

Hermanseter, M. S., & Mull, A. (2017). *Component of continuous assessment [Masters thesis]* [BI Norwegian Business School]. [https://biopen.bi.no/bi-](https://biopen.bi.no/bi-xmlui/handle/11250/2485706?locale-attribute=en)

[xmlui/handle/11250/2485706?locale-attribute=en](https://biopen.bi.no/bi-xmlui/handle/11250/2485706?locale-attribute=en)

Huffman, J. (2018a). *The growth marketer's playbook: A strategic guide to growing a business in today's digital world* (Kindle Edi). Amazon.

<https://doi.org/10.4324/9780203767061>

Huffman, J. (2018b, August 26). The real reason startups fail: How the right distribution strategy can save your company. *Geek Wire*.

<https://www.geekwire.com/2018/real-reason-startups-fail-right-distribution-strategy-can-save-company/>

Järvinen, M., & Mik-Meyer, N. (Eds.). (2020). *Margaretha Järvinen Nanna Mik-Meyer*. SAGE Publications.

John W. Creswell. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. SAGE Publications.

Kiehl, S. J. (1988). *A comparative study of the characteristics of high-technology start-up firms [Dissertations]*. Portland State University.

Kuckertz, A., Brändle, L., Gaudig, A., Hinderer, S., Morales Reyes, C. A., Prochotta, A., Steinbrink, K. M., & Berger, E. S. C. (2020). Startups in times of crisis – A rapid response to the COVID-19 pandemic. *Journal of Business Venturing Insights*, 13, e00169. <https://doi.org/10.1016/j.jbvi.2020.e00169>

Lewis, S. (2015). Qualitative inquiry and research design: Choosing among five approaches. *Health Promotion Practice*, 16(4), 473–475.

<https://doi.org/10.1177/1524839915580941>

Lofgren, K. (2013, May). Qualitative analysis of interview data: A step-by-step guide for coding/indexing. *YouTube*. <https://www.youtube.com/watch?v=DRL4PF2u9XA>

Mehralizadeh, Y., & Sajady, H. (2006). *A study of factors related to successful and*

*failure of entrepreneurs of small industrial business with emphasis on their level of education and training.* 1–39. <https://doi.org/10.2139/ssrn.902045>

Nyman, C. (2020). Finnish Startups: Success factors, challenges and reasons for failure.

*Theseus.* <https://www.theseus.fi/handle/10024/340480>

Ooghe, H., & De Prijcker, S. (2008). Failure processes and causes of company bankruptcy: A typology. *Management Decision*, 46(2), 223–242.

<https://doi.org/10.1108/00251740810854131>

Orkiszewski, P. (2012). A Comparative study of entrepreneurs' attitudes to failure in technology ventures. *International Journal of Innovation Science*, 4(2), 101–115.

<https://doi.org/10.1260/1757-2223.4.2.101>

Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. *American Journal of Health Education*, 35(2), 66–67.

<https://doi.org/10.1080/19325037.2004.10603611>

Riessman, C. K. (2007). *Narrative methods for the human sciences*. SAGE Publications.

Sarasvathy, S. D., & Menon, A. R. (2013). *Failing firms and successful entrepreneurs : serial entrepreneurship as a temporal portfolio.* 417–434.

<https://doi.org/10.1007/s11187-011-9412-x>

Scaringella, L. (2016). Journal of Engineering and Technology Management

Involvement of “ Ostensible Customers ” in really new innovation : Failure of a start-up. *Journal of Engineering and Technology Management*, 1–18.

<https://doi.org/10.1016/j.jengtecman.2016.11.001>

Schmuck, R., & Benke, M. (2021). An overview of innovation strategies and the case of Alibaba. *Procedia Manufacturing*, 51(2019), 1259–1266.

<https://doi.org/10.1016/j.promfg.2020.10.176>

Shepherd, D. A., Wennberg, K., Suddaby, R., & Wiklund, J. (2019). What are we explaining ? A review and agenda on initiating, engaging, performing, and contextualizing entrepreneurship. *Journal of Management*, 45(1), 159 –196.

<https://doi.org/10.1177/0149206318799443>

Shepherd, D. A., & Wiklund, J. (2006). Successes and failures at research on business failure and learning from it. *Foundations and Trends in Entrepreneurship*, 2(Supp 2006), 1–35.

<https://doi.org/10.1561/03000000007>

Stayton, J. (2015). Pitfalls of the fast startup. *SIBR 2015 Conference on Interdisciplinary Business and Economics Research, 4th-6th June 2015 Bangkok*, 1–35.

- US Bureau of Labor Statistics. (2020). *Table 7. Survival of private sector establishments by opening year*. [https://www.bls.gov/bdm/us\\_age\\_naics\\_00\\_table7.txt](https://www.bls.gov/bdm/us_age_naics_00_table7.txt)
- Van Gelderen, M., Thurik, R., & Bosma, N. (2006). Success and risk factors in the pre-startup phase. *Small Business Economics*, 16(4), 319–335.
- Volquartz, L., & Neumann, K. (2016). *Fostering and hindering factors — Success of early stage internet-enabled startups* (No. 2016–04).  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2789375](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2789375)
- Williamson, K., & Johanson, G. (Eds.). (2018). *Research methods: Information, systems, and contexts* (2nd ed.). Elsevier.
- Wolf, M., & Terrell, D. (2016). The high-tech industry, what is it and why it matters to our economic future. *Employment & Unemployment*, 5(8).  
<https://www.bls.gov/opub/btn/volume-5/the-high-tech-industry-what-is-it-and-why-it-matters-to-our-economic-future.htm>
- Yamakawa, Y., & Cardon, M. S. (2014). *Causal ascriptions and perceived learning from entrepreneurial failure*. <https://doi.org/10.1007/s11187-014-9623-z>
- Yin, R. K. (2017). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

## Appendices

### Appendix 1. Questionnaire

Dear Study Participant:

The study aims to investigate the factors that contribute to high-tech startup failures to provide support for further research. Here is a list of questions to understand every aspect of an organization that is relevant to making a success story out of a business venture. Your contribution is highly valuable to the success of this research being able to provide the researched with adequate data to analyze and evaluate the situation of a high-tech startup. Moreover, the value of the information provided herein is important to the researcher that the questionnaire results will be kept highly confidential and will be used solely for the purpose of this research.

#### I. Understanding the Context of the Startup Business:

1. How are the domains of the business determined?
2. Who are the relevant stakeholders of the business?
3. What are the needs and expectations of your relevant stakeholders?
4. How does the company address the issues of its relevant stakeholders?

#### II. Risk Assessment

1. Has the company conducted a risk assessment before the start of the operation?
2. What are the techniques used by the company to identify the risks related to the needs and expectations of the relevant stakeholders?
  - a. Brainstorming sessions
  - b. Interviewing subject matter experts
  - c. Root cause analysis
  - d. Problem prioritization
  - e. SWOT Analysis
3. What areas of risk categories have the company identified?
  - a. Technological risks
  - b. Operational risks
  - c. Quality and performance risks
  - d. Security risks
  - e. Legal risks

4. What risk prioritization methods were used by the company?
  - a. Probability impact matrix
  - b. Risk probability
  - c. Risk impact
  - d. Risk exposure
5. How does the company address the identified risks?

### **III. GOALS AND OBJECTIVES**

1. Are there established goals and objectives for the business processes?
2. What are the goals and objectives of the business processes?
3. How does the company determine the targets for the goals and objectives?
4. Are there monitoring and measurement tools for these goals and objectives?
5. How does the company address their unmet targets?

### **IV. CLIENT FOCUS**

1. What are the means of communicating with clients?
2. How does the company measure client satisfaction?
3. How does the company address client feedback?

### **V. Process Management**

1. Are processes established and documented for the business?
2. Are the resources identified and adequate to ensure that processes achieve their intended outputs?
3. How are sources allocated for each department?
4. How does the company address nonconformities in the processes?
5. How does the company ensure the continual improvement of their processes?

Thank you for your participation.