Handelshøyskolen BI

GRA 19703 Master Thesis

Thesis Master of Science 100% - W

Predefinert informasjon

Startdato:	09-01-2023 09:00 CET	**Termin:**	202310
Sluttdato:	03-07-2023 12:00 CEST	**Vurderingsform:**	Norsk 6-trinns skala (A-F)
Eksamensform:	T		
Flowkode:	202310||11184||IN00||W||T		
Intern sensor:	(Anonymisert)		

Deltaker

Navn:	Trung Quoc Dinh

Informasjon fra deltaker

Tittel *:	Frequent types of undertaken pivots and their external triggering factors: A multi-case study of software startups in Vietnam
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Inneholder besvarelsen konfidensielt materiale?:	Nei	**Kan besvarelsen offentliggjøres?:**	Ja

Gruppe

Gruppenavn:	(Anonymisert)
Gruppenummer:	128
Andre medlemmer i gruppen:	Deltakeren har innlevert i en enkeltmannsgruppe

Frequent types of undertaken pivots and their external triggering factors: A multi-case study of software startups in Vietnam

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1. INTRODUCTION

1.1. Research background and rationale

Software startups are companies positioning software as their primary value proposition, whose distinctive characteristics include an innovation focus, lack of resources, high uncertainty and time pressure, and rapid evolution (Nguyen-Duc et al., 2021). It has been reported that only some software startups could develop viable products or services right in the beginning, as for most, final products/services usually differed from what they planned to build in the inception phase (Bajwa, 2020). Moreover, the expectation of having competitive products/ services and rapid growth makes it a common practice for software startups to change their strategy incrementally or radically or in other words, make a pivot.

The Lean Startup, a book that Ries wrote in 2009, is credited with popularizing the term ‘pivot’. This term quickly gained widespread adoption by Lean Startup practitioners (Blank and Dorf, 2012; Maurya, 2012). In their study, Gruber and Tal (2017) concluded that 73% of entrepreneurial businesses will pivot at least once in their development. A pivot occurs when a startup shifts its core focus and fundamentally changes direction. Twitter, Instagram, and Flickr, to name a few, are examples of software companies that evolved through their early stages thanks to several successful pivots (Bajwa et al., 2017). Twitter, before being famous as a mini-blogging service, originally sold podcast services. Instagram’s photo-sharing application of today was once a function of their first inception of location-based service, when they were known as Burbn Company. In their own pivot case, Flickr changed themselves from the developer of a massively multiplayer online role-playing game to a platform for users sharing their own photos.

These pivots, indeed, helped these tech giants better meet their customers' needs and capitalize on opportunities in the market. Empirical research indicates pivoting is one of the most frequent and significant entrepreneurial decisions that involves unknowable outcomes and irreversible commitments. It can be beneficial in some cases, but may as well jeopardize stakeholder networks and threaten the viability of the company in others (Hampel et al., 2020; Pillai et al., 2020). Entrepreneurs may find it challenging to decide the best strategy for a pivot - what, when, and how to

pivot - as well as to predict the possible consequences, as a pivot choice occurs under uncertainty (Islam et al., 2017).

Still, unlike other stages of the Lean start-up approach (LSA), pivots, especially software startup ones, have received insufficient research attention (Hampel et al., 2020). Post-mortem analysis can describe a pivot and its impact, but it is less straightforward to understand antecedent factors and their connections to the pivot decisions.

Such literature gaps inspired the making of this research, which strived to answer the call of previous researchers to provide more empirical evidence on pivot types frequently undertaken, and factors triggering such pivots among software startups (Page and Holmstrom, 2023). Determinants to pivot decisions can be external factors (existing outside of a company and beyond the company's control), and internal ones (controllable elements and activities in the company). This research focused specifically on external triggering factors of pivots according to suggestion by authors like Eesley and Wu (2020) and McMullen et al. (2020): the role of external factors forming the context in which pivots needs more attention, being currently under-researched. Bajwa et al. (2017) further added that most pivots were made as reactions to external factors, rather than internal ones. This statement was backed by the authors' findings from a sample of pivots in software startups from various European countries: Undertaken pivots were caused more frequently by external factors, and there were more pivot-triggering external factors than internal ones.

The valuable contribution of findings from this research to the current literature also came from its sample which comprised software startups in Vietnam. Not only have previous empirical studies on entrepreneurial pivoting limited in number, they were also conducted nearly exclusively in developed economies (UK, European Union, Scandinavian countries and the U.S). There is a shortage of studies on this topic in developing countries in other regions of the world, where political and sociocultural conditions are different for development and pivots of software startups. Enablers, inhibitors, and consequences of pivots may differ for startups in different environmental conditions (Page and Holmstrom, 2023). This gap was addressed by the focus on Vietnamese startups in this project.

The government of Vietnam announced the project to "support innovative startup ecosystem in Vietnam until 2025" in 2016, which might be considered as the first official sign of governmental encouragement for formation of a startup ecosystem in Vietnam. As of today, the ecosystem has been steadily developing. With more than 3.000 active startups, Vietnam comes in third place overall in Southeast Asia (Australian Trade and Investment Commission Vietnam, 2019), demonstrating the country's strong potential for startup growth. However, despite the growing number of software startups in Vietnam, many face significant challenges that require them to adapt and pivot their business models. Vietnamese startups have yet to realize their full potential due to various factors. A principal factor is incoherence between external, macro-level factors and startup activites, without any actions or support from the authorities for startups to mobilise and develop to their potential (Phan, 2021). It is clearly necessary to have more empirical research on antecedents, types, and consequences of pivots in software startups in Vietnam.

1.2. Research aim, objectives and research questions

This multi-case study aimed to explore types of pivot frequently undertaken, and external factors triggering such pivots among software startups of various industries in Vietnam.

Objectives of this thesis are:

1. To identify types and categories of pivots frequently made by software startups in Vietnam
2. To explore external factors which triggered such pivots in the interviewed software startups
3. To compare and contrast findings on software entrepreneurial pivoting in this research and previous studies worldwide
4. To make some recommendations to academic researchers, software entrepreneurs, and policy-makers in Vietnam based on the research findings

The research objectives led to 3 research questions (RQ):

RQ1 – What types of pivots have software startups in Vietnam frequently undertaken?

RQ2 – What external factors have triggered the pivots?

RQ3 – Are the pivot types and triggering factors observed in Vietnam different from those in other countries?

1.3. Structure of this research

The research structure provides a logical progression of the thesis, starting with this introduction that sets the context and establishes the research objectives. The literature review chapter comprehensively overviews relevant theories and existing research on startup pivots. The methodology chapter details the research design and data collection methods employed. The findings and discussion chapter presents the results of the interviews and data analysis, synthesizes the findings, and discusses their implications. Finally, the conclusion chapter summarizes the key findings, contributions, limitations, practical implications of the study and offers recommendations for future research.

2. LITERATURE REVIEW

2.1. Software startup and Lean Startup Approach (LSA)

Across several philosophies, the term "startup" has been defined in numerous ways. Like entrepreneurship, there is no universal agree-upon definition of a startup. According to Blank (2013), a startup is a short-term company that aspires to develop cutting-edge items in the high-tech industry without any past job experience. He emphasizes further that in a startup environment, the company and its product should be developed concurrently. A startup's main objective is discovering a scalable business model that can be applied repeatedly (Blank, 2020). For Ries (2011), a startup is a human organization created to produce an original good or service in the face of extreme uncertainty. A startup should be viewed as a temporary organizational state looking for a proven and scalable business strategy rather than as a formal company. Specifically, software startups are those having either value creation entirely relying on software, or software taking a considerable role in the company’s infrastructure and products (Steininger, 2019).

Software startups always have a challenging journey. Via a systematic mapping research, Paternoster et al. (2014) concluded that the following contextual elements of a software startup are most frequently reported: general lack of resources, high levels of flexibility and reactivity, extreme time constraints, unknown circumstances, and dynamic and rapidly expanding markets. Furthermore, software startups constantly face the emerging challenges from all aspects. Top challenges are: Creating technologically innovative software products that require novel development tools and techniques; defining minimum viable products to capture; judging constantly changing situations that could harm the business concept before making decisions; and coming up with the optimum business strategy for value delivery (Giardino et al, 2015).

Finding an economically and financially viable business model that can add value to its clients is the main objective of a startup, and the Lean startup approach (LSA) is a process to verify business models in accordance with being agile and iterative. It is widely remarked that early-stage firms lack a workable business plan to realize their long-term goals, and that it is uncommon for startups to create their perfect

business plan (Bortolini et al., 2021). Adoption of the LSA can help, in which components of a business model of a startup are iteratively developed and tested to measure reactions of potential customers. Based on feedbacks from the customers, the startup can generate 'validated learning' and subsequently, make better informed decisions and find a 'validated' business model for scaling-up (Sala, Philbin and Barikzai, 2022). The 5 pillars of LSA include finding value, establishing a process flow, getting rid of excess engineering hours, creating high-quality products, and adding value to customers (Ghezzi and Cavallo, 2020).

LSA is therefore useful to explore opportunity and test hypotheses about products and strategies based on customer needs in order to generate market-fit products (Harms and Schwery, 2020). When hypotheses are rejected, startups have 2 choices according to the LSA: Either making constant adaptations based on customer feedbacks to match market needs, or making various types of pivots for more potential concepts (Bohn and Kundisch, 2018).

2.2. Pivots in software startups

Various definitions of pivot have been proposed in the literature. Tracing back in history, the term 'pivot' was initially introduced by Ries (2011) as unique types of structured changes which are intended to test and validate fundamental presumptions about a product, business strategy, and drives of growth. Axelson and Bjurstrom (2019) defined the pivot as a shift in how one approaches an idea. While Shepherd and Gruber (2020) referred to pivot as a planned method of rectification to test new hypotheses, Teece (2018) and Kirtley and O'Mahony (2020) saw pivot as a replacement of the current business model via reallocations of attention, resources and activities; the changes – adding or removing strategy elements – are gradual rather than sudden. According to most researchers, a startup pivots when it changes its strategy (Brenk et al., 2019).

In the early stages, tech startups may experience frequent changes in their business model and value capture approach when using the LSA, due to resource constraints or market conditions. A pivot decision is crucial as it goes beyond incremental adaptations, altering business strategy, product, or the entire business model. Still, most tech entrepreneurs choose to pivot when the concept is impractical or the

customer base is not growing (Hirvikoski, 2014; Hampel et al., 2020; Sherperd and Gruber, 2020). Berends et al. (2021) conducted a research to understand better the role that time plays in an entrepreneur's decision to pivot or persevere in the face of unforeseen circumstances. They demonstrated that entrepreneurs persevere via a linear trajectory by extending the past, lengthening the temporal time between acts and milestones, and complicating the anticipated temporal ordering. Contrarily, entrepreneurs pivoted by reflecting on the past and how it related to the present and future, shortening the temporal length between acts and results, and adhering to a temporal order dependent on the new course's success. Snihur & Clarysse (2022) argued that, despite the widespread belief that entrepreneurs constantly pivot their businesses, trying out various business models can be risky for startups since they have strong cognitive underpinnings that may limit future flexibility.

There are primarily 3 consequences of pivoting: Scaling, inertia, and disintegration/ failure. Scaling refers to the expansion in size and scope in the same business setting or into other business settings (Sahay and Walsham, 2006), or a considerable increase in market share leading to higher financial benefits, for example when finding a larger market for products initially destined for a niche market (Page and Holmstrom, 2023). Inertia is a period of lag or maintenance of current strategy, which is more often seen in more mature, larger companies rather than startups (Gong et al., 2009). Inertia may take place after a pivot, when companies consider the current strategy to be the most appropriate, or when they have neither interest nor capability to make another pivot. Disintegration/ failure is the last consequence, which is not always negative as many startups are aware of the high-risk, high-potential nature of entrepreneurial projects, and valuable experiences can be obtained from failures (Nair and Blomquist, 2018). Nair and Blomquist (2018) further proposed 4 strategies for startups to avoid failures following pivots, including Focusing on the team over the product (service), Business model innovation, Business model development and Business model scalability. They are presented in more details in the Recommendations section of chapter 5.

2.3. Types of pivots in software startups

Although the concept of pivot has gained significant attention from practitioners and academic researchers alike recently, views are divergent regarding magnitude of change of a pivot, and conceptualisation of pivot types and influential factors

(Bohn and Kundisch, 2020; Hampel et al., 2020). Some authors like Bandera and Thomas (2018) believed that any direction changes, big or small, are pivots, while others such as Ries (2011) only considered major adjustments as pivots (Page and Holmstrom, 2023).

The first typology of pivot was introduced by Ries (2011), which comprised 10 types of pivot strategies for startup companies. As more pivot forms were identified by later researchers (notably, Hirvikoski, 2014; Bajwa et al., 2016, 2017; and Sala et al., 2022), nowadays, there are totally 16 types of pivots belonging to 4 categories: Product level, Market level, Strategy level, and Team level (People level in some studies) pivots. Terms like startups, entrepreneurs, and companies are used interchangeably in this latest pivot typology.

Product level pivots (4 types)

Zoom-in pivots: A single product feature that draws the largest customer base eventually makes up the entire product.

Zoom-out pivot: This pivot type flips the zoom-in pivot on its head, turning the entire product into a single feature of a much larger product.

Technology pivot: When startups try to utilize their resources to provide customers with the best products or services. Various technologies can be involved to solve the same problem.

Platform pivot: One of most frequently employed pivots in the software industry. Businesses provide software for their platforms, but occasionally, the platform becomes a saleable item to clients.

Market level pivots (4 types)

Customer segment pivot: When startups create products or services targeting a specific client group. However, the business may discover that although the product is drawing customers, they are not the initially-targeted customers. Consequently, startups must reposition their goods or services and tailor them to that market niche.

Customer need pivot: By attending to customer needs, startups attempt to monetize an idea. However, the customer's most pressing demand may be different from the

initial idea for the product or service. As a result, the startups will change course to satisfy a crucial client requirement.

Channel pivot: Businesses need a channel to communicate with their customers. Startups may try to promote their goods directly to consumers, or they may choose to use alternative channels. A channel pivot is fundamental for any business to connect with clients.

Market segment pivot: Because they perceive the potential for the business to grow, startups may choose to concentrate on entering a particular market segment rather than the entire market.

Strategy level pivot (7 types)

Value capture pivot: This pivot will be used by businesses to modify how they make money from their products. Then this change will impact the value captured by the product, businesses, and growth engine.

Engine of pivot: Companies change their business models to increase their growth rate, profitability, and consumer base. Viral, sticky, and paid growth models are the primary growth engines. Growing more quickly is the main driver behind startups changing their engines of the growth model.

Business architecture pivot: The high-margin and low-volume model and the low-margin and high-volume model are the two main company architectures (Moore, 2007). The company that wants to pivot to any of the above business architectures can adopt any of them at a given time.

Complete pivot: A firm can use a pivot to alter a product, strategy, or market. A complete pivot occurs when a team agrees to alter the whole business model (including all three areas).

Side project pivot: Many businesses might start a side project in addition to the primary activity. However, occasionally, a side project becomes the company's primary project; this kind of pivot is known as a side project pivot.

Business ecosystem pivot: A strategic alliance or cooperation between two companies in order to increase their client base and expand into other market segments is known as a business ecosystem pivot.

Brand pivot: brand pivot occurs when startups rename their numerous goods under one brand and one domain rather than pulling them out of various brand categories.

Team level pivot (1 type)

Social pivot: In pivoting, social variables are crucial. These elements may result from alterations in the environment or the people involved, such as working on an existing concept while engaging with an altogether new team.

In practice, a startup may have undertaken, and will adopt various pivots in its evolution. Empirical evidence taken from previous studies confirmed this statement. Additionally, certain categories of pivot seemed to be preferred by software startups in some investigated countries. The evidence, reviewed here in a chronological order, also pointed out the lack of findings on pivot types employed on a global scale generally, and in developing, Asian markets like Vietnam specifically (which was one source of inspiration for this project). A wide variety of keywords were inputted into search engines such as Google Scholar and those of renowned journal databases (Elsevier, Science Direct, and Emerald Insight) to identify recent (2015 or later), officially-published secondary data (journal and conference articles and reports) on the pivot types and determinants of pivot decisions. Examples included 'pivots in software companies', 'pivots in startups in Vietnam', 'determinants of pivot decisions', etc.

In Bajwa et al. (2016)'s multi-case study of 4 software startups in 3 European countries (Italy, Austria, and Norway), the companies employed various pilots of all 4 pivot categories (Product, Market, Strategy and Team level pivots) over time since their establishments. Market level pivots, particularly Customer need and Customer segment pivots, were the group the most frequently exercised (3 out of 10 pivots). Similarly, Product level pivots, including Technology pivot and Zoom-out pivot, also accounted for 3 pivots. Complete pivot (in Strategy level pivot category) and Team level pivot also took place, though less frequently (2 out of 10 pivots for each).

Bajwa et al. (2017) conducted a similar study, this time in a larger sample of 49 software startups in various European countries. They confirmed again the 55 pivots made by the companies so far could be categorised into 10 types of pivots in 3 pivot categories (Product, Market, and Strategy level pivots). No pivot in the

Team level pivot group was recognised in this sample. Market level pivots continued to be the strongest group, accounting for 24 out of 55 pivots, with Customer need pivot the most frequently exercised (17 times). Product level pivots followed with 17 pivots, in which Zoom-in pivot was the strongest type (8 times). Strategy level pivots were conducted 14 times, in which Complete pivot was done 11 times.

Bohn and Kundisch (2018) focused only on investigation of technology pivots among software companies. From a sample of 91 pivots in 57 startups in Germany, the authors confirmed that technology pivot (a type in the Product level pivot category) was frequent and played a critical role to survival and growth of the sampled companies. They further divided technology pivots into necessary (under pressures of new technological advances) and desirable (proactive, opportunity-seeking, potential-driven) ones.

Fitria and Fathurachman (2022) provided a rare empirical study on the topic in the context of a developing Asian market (Indonesia), amid the usual attention to startup pivoting in developed economies in the current literature. From a sample of 4 software entrepreneurs, their findings resemble considerably to the ones by earlier researchers: Market level pivots (Customer segment and customer needs) occurred the most, followed by Product level pivots (Zoom-in, Zoom-out and Platform pivots), and Strategy level pivots (Business architecture and Value capture pivots).

Sala et al. (2021) and Sala et al. (2022) both focused on the UK. From a sample of 80 tech startups, the authors noticed all kinds of pivots except Team level ones, with Customer segment and Customer need pivots (Market level pivot category) continued to occur most frequently. However, a remarkable difference was the number of Strategy level pivots employed, which made this category the second most exercised pivot group among the examined companies; all pivot forms in this category were found, except for Brand pivot. Product level pivots, containing Zoom-in, Zoom-out and Technology pivots, came third. In their later work, the same methodology was applied to a smaller sample of 30 UK high-tech startups. Again, 3 out of 4 most applied pivots were in the Market level pivot category (Customer segment, Customer need, and Channel pivots). The second and third most frequently-seen pivot groups were Strategy and Product level ones. Sala et al. (2022)'s contribution was the addition of 2 more pivot types – Business ecosystem

pivot and Brand pivot into the Strategy level pivot category – based on suggestions from their interviewees.

The most recent empirical work that was found for this literature review on employed pivot types is by Page and Holmstrom (2023). Among 14 tech startups studied, the authors identified various types of pivots belonging to all 3 categories (Product, Market, and Strategy level pivots, with the frequency of adoption from high to low in this order).

2.4. External determinants of pivots in software startups

Pivot decisions can be triggered by both external factors (beyond control of startups), and internal ones (operations and activities under the control of startups) (Sala et al., 2022). The former group of factors was the focus of this project. Previous researchers have identified various factors in the external environment that can trigger pivots. Summarised and validated by Bajwa et al. (2017) and Sala et al. (2021, 2022), the 14 key factors (8 external and 6 internal ones) are presented in **Table 1**.

Table 1 – 14 key triggering factors (antecedents) of pivots in software startups.

Sources: Bajwa et al. (2017), Sala et al. (2021, 2022)

S. NO.	TYPE OF FACTOR	NAME OF FACTOR	DEFINITION
1	External	Customer feedback (F1)	A negative consumer response or complaint about the product or service, along with a poor customer acquisition or retention rate, causes a pivot.
2	External	Technology challenge (F2)	Technology issues like constraints with the current technologies or new disruptive

			technologies having improved performance would trigger to pivot.
3	External	Competition (F3)	Several established companies and new start-ups can carry out a concept more successfully than the original start-up, resulting in the failure of the start-up caused by competition.
4	External	Unscalable business (F4)	Although a start-up may answer a need, if the customer is not engaged, the start-up might eventually turn unscalable.
5	External	Wrong timing (F5)	Customers may not be ready to embrace an approach of the start-up to a solution for the product or service. So improper timing results in pivots
6	External	Market condition (F6)	If the market narrows substantially, it can trigger the pivot. As the start-up cannot survive or grow, it has no value because there is no longevity.
7	Internal	Influence of investor or partner or founder (F7)	An entrepreneur may have a start-up idea, but an investor, partner, or mentor may persuade them to alter the direction of the business, leading to the pivot.
8	Internal	Legal issues (F8)	A legal problem, such as patent infringement or copyright violation, could seriously affect the start-up. As a result, the start-up needs to adjust its direction for legal reasons.

9	Internal	Flawed business model (F9)	Pivot occurs when the start-up has a flawed business model due to high incurred costs in generating revenue, retaining existing customers and customer acquisition. The business model is essential to a start-up's growth and sustainability.
10	Internal	Side project success (F10)	A pivot might appear if the customers show better engagement in the project the company starts as a side project than the main project.
11	Internal	Business financials (F11)	Cash and financing are crucial to ensure the sustainability of start-ups. A business needs to invest funds and have a stable revenue stream to generate more money.
12	External	Geopolitical issues (F12)	Startups might trigger pivots when they conduct the business globally
13	External	Substitution by new entrants (F13)	A factor that companies might face when operating internationally, especially, in a non-conventional market
14	Internal	Strategic longevity (F14)	Advantage a startup gains from diversifying its solution inside its industry of operation. By adding value, it also helps businesses reduce competition and build stronger relationships with customers.

The 8 external factors of focus in this project include: Customer feedback (F1), Technology challenge (F2), Competition (F3), Unscalable business (F4), Wrong timing (F5), Market conditions (F6), Geopolitical (F12) and Subsitution by new entrants (F13). Their detailed descriptions are provided below, together with empirical evidence from previous researchers on their role to pivot decisions. It is clearly seen from the review that recent findings (published 2015 and later) on antecedents of pivots are few on the worldwide scale (which was one rationale for this project). Evidence for the said 8 external factors, therefore, is quite concentrated in a small number of works.

Customer feedback (F1), Competition (F3), Unscalable business (F4) and Substitution by new entrants (F13)

Changes in customer attributes and customer feedbacks have the utmost impact on pivot decisions, either theoretically (seen from definitions of pivot types in section 2.3) or empirically.

In Fitrial and Fathurachman (2022)'s Indonesia-based study, better understanding of customer demands based on their feedbacks and opportunities to match customer needs were 2 out of 5 key reasons why the sampled startups pivoted. Feedbacks from customers was the second most important factor (only after 'flawed business model', which was an internal factor) which drove pivot decisions of UK startups in the study by Sala et al. (2021). Changes in customer preferences (demands, channels, products etc.) and customer feedbacks, as a key drive of pivots, were also confirmed in the empirical works by Bajwa et al. (2016, 2017), Nguyen-Duc et al. (2017), Dennehy et al. (2016), Nguyen-Duc and Abrahamsson (2016), Comberg et al. (2014), and Blank (2013) among startups in various developed countries.

Sala et al. (2022) agreed with this finding from Sala et al. (2021) and added 2 more factors which were competition in the industry and substitute threat from new entrants. Competition in the industry (F2) was earlier seen in studies by Eloranta (2014).

Technology challenge (F2)

Technological advances are obviously a critical drive of startup pivots. On the one hand, developments of digital technologies in the past decade are widely agreed to

be ‘external enablers’ of the democratisation of entrepreneurship, reducing considerably startups’ scaling-up efforts (Briel et al., 2018). New technologies are among the six primary groups of triggering factors for business model innovation, according to Comberg et al. (2014)’s multi-case study of German entrepreneurs. On the other hand, technological uncertainty is also a leading challenge to specifically software startups, which explained why technology pivot (in Product level pivot group) has been very common among these startups (Bohn and Kundisch, 2018). Bohn and Kundisch (2018) themselves surveyed 57 German entrepreneurs and confirmed that pivoting to catch up technologically with competitors or seeking business opportunities from novel technologies was frequent among the 91 pivots made by the examined startups. Similarly, in the UK, Sala et al. (2021) found technology challenges to be the fourth leading reason why the sampled software entrepreneurs decided to pivot. Other studies which have the same thinking regarding the importance of technology to pivot decisions include Bajwa et al. (2016, 2017), Dennehy et al. (2016), Eloranta (2014), Fagerholm et al. (2014) and Ries (2011).

Sadeghiani, Shokouhyar and Ahmadi (2022) supported the importance of technology to business model pivoting of startups by examining the role of competitive intelligence (Alexa, Google Analytics, and NexLab TrackEngine). Their multi-case study of 5 Iranian startups confirmed that such competitive intelligence (comprising market, competitors, technological, and strategic and social intelligences) helped the companies make better informed decisions and improve success of their pivots, especially in their early stages.

Wrong timing (F5)

Improper timing refers to failure of good products (services) which are unwelcomed by customers who are not ready for these novel solutions. Consequently, startups have to pivot in hope of finding new revenue resources to survive. Wrong timing as a pivot triggering factor was mentioned in studies by Bajwa et al. (2017), Hitvikoski (2014), Munch et al. (2013) and Nobel (2011), all in developed markets.

Market conditions (F6)

Pivot happens when the startup’s market substantially increases or reduces. Market shrinkage or expansion depends not only on customers, but also political, legal and

economic conditions on the markets. For example, Bajwa et al. (2017) and Sala et al. (2021) revealed that legal issues were one source of pressure which drove software startups' pivots in the UK and various European countries. Similarly, 2 out of 13 Swedish startups interviewed by Page and Holmstrom (2023) admitted making Product level pivots due to changes in relevant European Union regulations. If the pivot were not done, they would have risked facing legal fines, losing legitimacy and markets.

Geopolitical (F12)

Pivots may be triggered by startups having cross-border activities when geopolitical conditions change in their markets where they operate (manufacturing and/or selling). Examples of a critical geopolitical event which have caused pivots include the U.S-China war trade, and the Ukraine conflict.

An analysis of the current literature also gave an idea that some essential external factors can be added into **Table 1**. In specific, they can be grouped into 2 elements in the PESTEL framework of external environment for organisations, P – Political, and E – Economic factors. PESTEL is an essential, standard tool to evaluate factors in the macro environment (in which a company operates) which helps determines the company's strategic decisions (in this project, pivoting ones) (Johnson et al., 2020). Letters in PESTEL stand for elements in the macro environment, including Political – Economic – Sociocultural – Technological – Environmental (or Ecological) and Legal aspects.

Political environment

External political factors refer to policies and actions by governmental agencies. They can obviously have enormous impacts on startups' decisions to pivot: A conducive political environment can facilitate pivots and improve their success. Pivots may also be made in order to either seize opportunities from new policies, or to comply with their requirements.

On the one hand, governmental agencies can act as consultants and service providers, or incubators, to entrepreneurial activities. With helps such as knowledge transfer, coaching, help in developing and reducing flaws in business models, pressure-testing of viable products, access to financial support and networks, and

subsidised office space (Shephert and Gruber, 2020), incubators not only help reduce barriers to entrepreneurship, but also lessen failures as a potential consequence of pivots (compared to an incubator-less setting) (Nair and Blomquist, 2018). Besides favourable economic conditions, a supportive regulatory framework is essential for the building of a startup-nurturing, pivot-facilitating ecosystem (Motoyama, 2017). In Page and Holmstrom (2023)'s interviews with Swedish entrepreneurs, all of the interviewees agreed that the incubators in the country provided them with valuable services that improved their success to pivot and grow. The supports varied from accounting, financing, marketing, to legal services, networking opportunities, as well as internal coaching (IPO preparation, sales training and price-setting).

On the other hand, startup growth and their pivot decisions are negatively affected by administrative burden and governmental intervention in markets (Acs et al., 2009). A study among 32 Arab FinTech startups by Zarrouk et al. (2021) raised the same concern, where regulatory issues had a tremendous impact on the interviewed startups' pivot decisions.

Economic environment

Economic factors such as changes in inflation/purchasing power, monetary policies (interest rates, exchange rates, money supply etc.), Gross Domestic Product (GDP) or national economic health can obviously affect profits and subsequently, pivot decisions of startups. Cost increases have frequently been cited as a reason for pivot in previous empirical studies, particularly due to the Corona virus and its consequences (lockdowns, supply chain disruption and economic downturns). While some startups pivoted to reduce cost in order to survive, others pivoted to exploit opportunities and improve profits, such as by expanding customer base and introducing online channel (besides offline/ physical one) (Page and Holmstrom, 2023).

A new suggestion: Catastrophe-related triggers

The occurrence of the Corona virus and the Ukraine conflict, and their impacts on all aspects of the external environment has led some researchers such as Sala et al. (2022) and Page and Holmstrom (2023) to suggest these new pivot-triggering factors. Their adverse influence on activities and consequently pivoting decisions

of startups was seen in empirical works by Zarrouk et al. (2021) among Arab startups, and Page and Holmstrom (2023) in Sweden for example.

In summary, Table 2 shows macro-level (categorised using the PESTEL framework) and new factors in the external environment that can trigger pivots in software/ tech startups as seen from previous empirical studies. This finding suggested that besides the 8 external factors presented in Table 1, there could be macro-environment factors that trigger pivots. Such a suggestion was also examined in this project to improve value of research findings.

Table 2: Some macro-level factors which could trigger pivots in software startups.

PESTEL aspects/ Groups of triggering factors	**Factors**
Political environment	Governmental agencies as incubators; conducive policies and regulations; administrative burden or government's intervention in markets
Economic	Economic policies which affects costs or revenues
Catastrophe-related triggers	Corona virus

2.5. Literature gaps and the conceptual model for this research

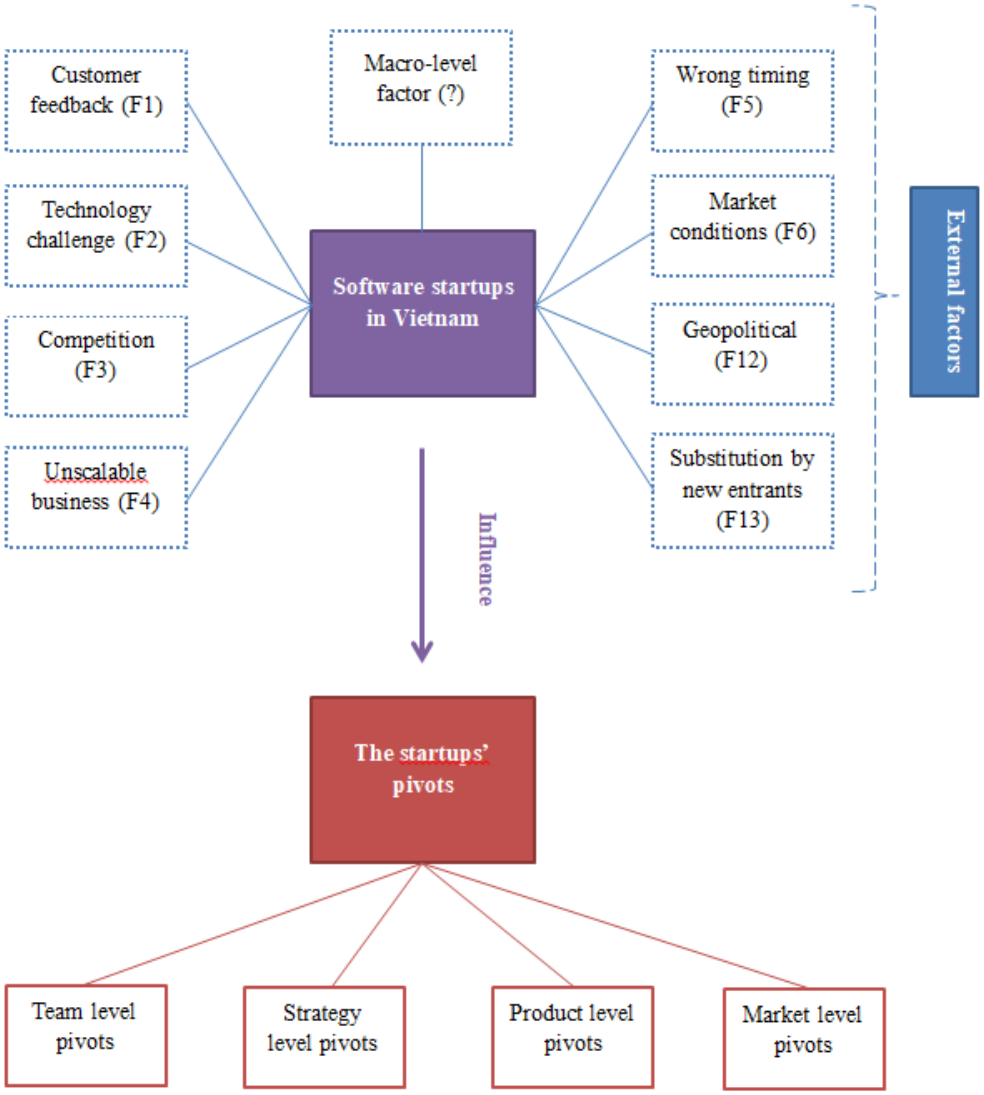
A review of the current literature for this project validated the remark by most researchers on the topic, including Frederiksen and Brem (2017) and Bohn and Kundisch (2018) for example, that empirical evidence on types of pivot frequently adopted and triggering factors of such pivots remain scarce. Remaining gaps in conceptualisation as well as evidence of pivot typology, determinants, and consequences make it hard to improve success of pivots (Bajwa et al, 2017). This

research helped to fulfil the gaps concerning pivot forms most frequently employed by software startups in the context of a developing Asian country (Vietnam), and external factors triggering such pivots. It went beyond the 8 key external factors proposed by the most recent researchers (Bajwa et al., 2017; Sala et al, 2021, 2022) by further looking for the role of macro-environment factors. They could be Political environment and Economic environment (in the PESTLE framework) and a newly-suggested factor - Catastrophe-related triggers. They could as well be other components of PESTLE for this Vietnam-based study.

Other unresolved gaps such as internal triggering factors of pivots, domino effect or interrelationships among the triggering factors (Terho et al., 2015), or consequences of pivots are limitations of this research and areas for future studies.

The pivot typology presented in section 2.3 and a summary of external factors triggering startup pivots shown in Table 1 allowed for the construction of a conceptual model for this research (Figure 1).

Figure 1 – Conceptual model of this research


Customer feedback (F1)
Technology challenge (F2)
Competition (F3)
Unscalable business (F4)
Macro-level factor (?)
Software startups in Vietnam
Wrong timing (F5)
Market conditions (F6)
Geopolitical (F12)
Substitution by new entrants (F13)
External factors
Influence
The startups' pivots
Team level pivots
Strategy level pivots
Product level pivots
Market level pivots

3. METHODOLOGY

3.1. Research approach and method

The researcher agreed with researchers having previously investigated this topic in the literature that an explorative, qualitative study, using an interpretivist, inductive approach would be the best solution to achieve the research objectives. Indeed, these have been the dominant methodological choices in the literature, which can be clearly seen from all empirical studies mentioned in the last chapter. The investigated startups may differ by industry, country, or development stage, and by findings on their pivot types and pivot-triggering factors across the reviewed studies, but all of the researchers followed similar methodology.

Having an interpretivist perspective means accepting that the phenomenon is influenced by human interactions, and findings on its determinants are subjective which can differ by companies/researched subjects and researcher (Bell, Bryman and Harley, 2019). According to Page and Holmstrom (2023), Interpretivism is the school of thoughts more suitable for studies on factors triggering pivots than Positivism or Critical ones, as pivot-making is a phenomenon rooted in complex environmental factors, including sociocultural interactions.

The inductive approach with a qualitative method (for data collection and analysis) was selected for its alignment with the interpretivist philosophy and the literature gaps: This bottom-up approach aims to generate theories from collected data, rather than the other way around when using a deductive approach. In a deductive approach, hypotheses pre-determined based on existing theories are tested with collected data in order to improve the theories. However, there has not yet consensus on a standard typology or set of triggering factors for pivots: the theoretical background provided in the last chapter was built by combining several recent sources, which could be used as a reference/ comparison base rather than standards (Page and Holmstrom, 2023). Consequently, the use of a deductive approach was not recommended. Meanwhile, a qualitative method was preferred to a quantitative one for its match with the intended data instrument (interviews), and potential to achieve new, in-depth findings (Bell et al., 2019).

3.2. Research strategy

The multi-case study strategy was adopted for this research because of the following reasons: Potential to collect richer data from several than a single source; The need to compare and contrast findings from several case studies in order to build theories currently lacking in the literature (Hannah and Eisenhardt, 2018), which concerned pivot types and external triggering factors in this project; The actual, dominant use of this strategy in previous studies on the topic, which validated the usefulness of this strategy to answer the research questions. Additionally, a case study strategy is ideal for interpretivist research of sociocultural phenomena in an actual setting, in which the 'how' and 'why' questions are raised (Myers, 2013). It was a fit to this project which sought to understand 'how' and 'why' pivots were made in Vietnam-based software startups ('how' – which pivot types, and 'why' – under influences of which external factors). The case study was also a good choice when other research strategies such as Grounded Theory, Action Research and Ethnography were dismissed based on their unmatching purposes (Myers, 2013; Page and Holmström. 2023).

As the data instrument was interviews, this project also followed a Survey strategy (Saunders et al., 2012). This strategy, together with the multi-case study strategy, was also a favourite choice in previous empirical works on entrepreneurial pivoting. Specifically, semi-structured interviews were used for its advantages: Familiarity of people with interviews as a data collection tool; flexibility and creativity for richer information for interviewees and interviewers, while ensuring that information needed to answer the research questions was still collected (via some pre-determined questions) (Bell et al., 2019).

3.3. Population, sampling techniques and the research sample

The potential population for the research topic would be all software startups located in Vietnam, which was clearly too big and ambitious for this project. Some sampling techniques, which had been employed previously by several researchers in their works on entrepreneurial pivoting in other countries, were replicated for this project after considering the researcher's available resources (time, networks and others). They were all non-probability techniques. By using a combination of these techniques, it was expected that disadvantages of one are reduced by

advantages of others, which overall improved reliability and validity of the research findings (Saunders et al., 2012).

Purposive sampling: Participants were selected based on certain criteria relevant to the research objectives, and this technique is particularly suitable for case study research having a sparsely-distributed population (Bernard, 2017). Selection criteria were software startups founded in Vietnam, who have undertaken at least one pivot since their establishments. There was no restriction regarding the startups' industry and specific location/ city. Target interviewees were CEOs/CTOs in these startups for their rich knowledge on the research questions (Sala et al., 2022).

Convenience sampling: Entrepreneurs whose companies satisfied the selection criteria were contacted on a convenience basis: Those in the family and professional networks of the researchers were contacted, and they were accepted for the research sample if they agreed to be interviewed for this topic. The combination of these 2 sampling techniques resulted in 4 out of 6 interviewees.

Snowball (reference, respondent-driven) sampling: People in the researcher's networks, including entrepreneurs willing to participate in the research interviews, were also asked to refer the research and its call for more participants to startup CEO/CTOs in their networks. 2 interviewees in the final research sample, who were interested in findings from this Vietnam-based project, were actually approached by this technique.

Research sample

The research sample composed of 7 CEOs/ CTOs of 6 software startups in Vietnam (primarily located in Ha-Noi and Ho-Chi-Minh) is described briefly in Table 3. The sampled startups are operating in 6 different sectors, from education, entertainment, sales and marketing, to financial services, and forestry and lumber. For ease of data analysis, they were coded as seen in the Table.

Table 3 – Initial description of software startups forming the research sample.

No.	**Description**	**Coded Name**

1	An e-English learning service provider for young customers with the affiliate of a popular English IELTS website for Vietnamese teenagers in the past. It is building up its own app version with AI association for scoring and suggesting tailor-made programs for every individual user.	A
2	A startup specialized in Gamefi, known as the publisher of the game Gunstar (allowing players to earn money while playing games through trading NFT embedded game items with others). Established in 2021, at the peak of games and blockchain worldwide, Gunstar was backed by various big investors in Asia. Now, it is looking for more sources of revenue when the market is lukewarm.	B
3	A leading startup in Vietnam's personal credit scoring industry using an alternative method. The company uses applicants' data acquired from the telco service providers for their model in order to provide insightful information for institutions of personal credit.	C
4	Operating in the cloud service industry, this 4-year-old company is leading in Content Delivery Network cloud modules. It aims to provide full-ranged cloud platforms with friendly integration feasibility to develop scalable sales distribution networks through co-operations with System and Solution Integrators in the market.	D
5	A pioneer solution provider of corporate loyalty systems in the fresh-edge market of B2B marketing technology in Vietnam. Experiencing the unreadiness of Vietnam SME markets and realizing its hard-to-scale-up solution, it is considering several options for pivots.	E

6	A new software consulting company using the geographical tech model to help its customer in monitoring and forecasting assistance of the forestry and lumber industry. Established initially as a Data-as-a-service provider, it forces to pivot in the first year.	F

Table 4 provided more information obtained from the interviews on the startups, including their ages, numbers of founders and employees, and current product development stage. These details, again, vary greatly among the sampled companies.

Table 4 – Background summary of the interviewed software startups

No.	**Software Startup**	**Business Domain**	**Founded**	**No. of Founders**	**No. of Employees**	**Current Product Dev. Stage**
1	A	E-foreign language learning solutions; Consulting services for overseas study	2017	3	60	Functional product with high growth
2	B	Gamefi and blockchain developing	2021	9	25	Functional product with

		and publishing				limited users
3	C	Credit scoring	2019	2	30	Mature Product
4	D	Cloud solutions	2018	4	20	Mature Product
5	E	Loyalty solution for B2B2C business	2021	2	15	MVP #1 completed, developing MVP #2
6	F	Platform as a service and Consulting	2023	4	4	Working prototype

** MVP (abbreviation): Minimum Viable Product*

3.4. Data instrument and data collection

Data instrument: Individual interviews

The instrument used to collect primary data in this project was a semi-structure interview. It comprised of several questions, including pre-determined questions as well as those added in to further clarify responses and/or reduce misunderstanding. Briefly speaking, the questions belonged to 2 groups corresponding to the first 2 research questions – pivots previously adopted by the interviewed startups, and why/factors leading to such pivots.

The Interview Guide is presented in Appendix 3

Data collection

8 interviews were conducted face-to-face and individually, 5 online via Zoom, and 3 in person. Time and location of the interviews were chosen mostly for convenience of the interviewees. Before asking questions in the Interview Guide, the researcher spent time introducing briefly about this project (aims, objectives, academic nature), general concepts on entrepreneurial pivoting (definition and common types of pivots), and rights of interviewees (especially regarding confidentiality and secure protection of data). In return, the interviewees also provided information on their background (presented in Table 4).

7 founders/CEO/CTOs of the 6 sampled software startups were interviewed; one CEO participated in 2 interview sessions in order to answer all interview questions, due to his constrained schedule. Video- and audio-recordings were made for all interviews on Zoom, while offline interviews were audio-recorded. Each interview lasted from 30 to 60 minutes.

In order to the interviews to keep a smooth flow and open atmosphere in which the interviewees could express their opinions without interruption, and the researcher could focus on asking questions to obtain in-depth details and/or overcome misunderstanding, no notes was taken during the interviews. Notes were made later when analysing interview transcripts by the researcher, which are presented in the separated appendix of the thesis.

3.5. Data analysis

Qualitative analysis of primary data (in the textual format) obtained from the interviews involved two main steps. The first step was coding the startups' names for confidentiality reason (into Company A to F, previously seen in **Table 3**). The second step was to use the Thematic Analysis to interpret information from the interviews.

The Thematic Analysis by Braun and Clarke (2012) is a method to systematically identify, organise, and interpret themes (patterns of meanings) in the collected dataset (interview transcripts from 8 interviewees in this project). This analytical method has been widely selected and validated by previous researchers to examine

pivot types and pivot-triggering factors. Its advantages are flexibility, simplicity and suitability for analysis of interviews (Bernard, 2017).

Briefly speaking, the analysis process comprised transcribing interviews, coding, categorising codes into sub-themes and themes, and interpreting the findings. In details, preliminary codes were manually identified and constantly changed with more interviews transcribed. Some codes were then grouped into sub-themes, which were XX types of pivots (out of 16 pivot types summarised in section 2.3). They were further grouped into 3 pivot categories (Product, Market, and Strategy level pivots) (out of 4 pivot categories in section 2.3), before grouping again to form the first Theme 'Types of pivots frequently undertaken by interviewed software startups in Vietnam'. The remaining codes were grouped into sub-themes including internal and external triggering factors of the pivots. Sub-themes of the external factors, the focus of this project, included those seen in the factor summary of Bajwa et al. (2017) and Sala et al. (2021, 2022) (presented in **Table 1**) as well as one macro-level factor unseen in this **Table** but its possible existence was mentioned in the conceptual model (**Figure 1**). They included the 8 external triggers taken from the said summary, and a catastrophe-related trigger. Together, they formed the second Theme 'External triggering factors of pivots in the interviewed startups'.

3.6. Ethical considerations

Several ethical issues were considered before and during the making of the interviews and this research in order to avoid potential negative consequences of ethical violations, and to improve reliability and validity of the research findings.

The introduction part before the interviews were conducted provided interviewees with necessary information about this research and their rights when taking part in the data collection. Efforts were made so that the interviewees could participate at their convenience (time and place), and communicate their ideas at ease. Interruptions were minimised and hardly initiated by the interviewer, and interviewees were asked if they had any questions for the interviewer before and during the interviews. Interviews were recorded and properly transcribed, notes for findings from the interviews were carefully made and honestly reported in this

project. Findings from the collected data, following precisely the described methodology, were also correctly presented in the next chapter.

3.7. Limitations of the research methods

When conducting research on the frequent types of undertaken pivots and their external triggering factors in software startups in Vietnam using interviews from six Vietnamese companies, there are several limitations to consider:

Limited sample size: The sample size of six companies may not provide a comprehensive representation of all software startups in Vietnam. It might be difficult to generalize the findings to the entire population of software startups in the country. The small sample size also limits the statistical power of the study.

Sampling bias: The selection of the six companies might not be entirely random and could be subject to sampling bias. The companies chosen for the interviews may not be representative of the broader population of software startups in Vietnam. This could introduce biases in the findings and limit the generalizability of the results.

Self-reporting bias: The information gathered from interviews relies on the participants' self-reporting, which may introduce biases. The interviewees might provide incomplete or inaccurate information, consciously or unconsciously, due to social desirability bias or memory limitations. This can affect the reliability and validity of the data collected.

Subjectivity of interpretation: The analysis of the interviews and identification of frequent types of undertaken pivots and their triggering factors involve subjective interpretation. Different researchers might interpret the responses differently, leading to potential variations in the findings. It is important to ensure inter-rater reliability or use a coding framework to minimize subjectivity.

Generalizability to other contexts: The findings of the study may be specific to the context of software startups in Vietnam and may not be applicable to startups in other countries or industries. Factors such as cultural differences, economic conditions, and regulatory environments can vary across different contexts, affecting the nature of pivots and their triggering factors.

Lack of longitudinal perspective: Interviews provide a snapshot of the experiences and insights of the companies at a particular point in time. However, without a longitudinal perspective, it is challenging to capture the dynamic nature of pivots and understand their long-term implications. Longitudinal studies or a larger sample size could provide a more comprehensive understanding of the phenomenon.

Reliance on retrospective data: The interviews rely on the participants' recollection of past events and decisions. Retrospective data can be subject to memory biases and may not accurately reflect the actual decision-making processes and factors that influenced pivots at the time they occurred.

4. FINDINGS AND DISCUSSION

4.1. Types of pivots undertaken in the interviewed software startups of Vietnam

Table 5 summarised pivots identified in interviews with the 6 startups. A wide variety of pivot types were undertaken (10 types in total) among the 14 past pivots, which belonged to 3 categories of pivots (Product, Market and Strategy level pivots) according to the pivot typology built from Bajwa et al. (2017) and Sala et al. (2022) (seen in section 2.3 of the Literature Review). Strategy level pivot was the category with the most pivots, accounting for 6 out of the 14 pivots. Product level pivot group followed with 5 pivots, and Market level pivot category accounted for 3 pivots. No Team level pivot was found.

Out of these 6 companies, 3 companies have experienced 3 pivots, 2 companies already performed 2 pivots, and only 1 company made 1 pivot. In the companies who have pivoted more than once, although the pivots may fall in the same pivot category, they were never the same type; in other words, each time an interviewed startup pivoted, the selected pivot type was different from the earlier one(s).

Pivot Category	Identified Pivot	Company						No. of pivots
		A	B	C	D	E	F	
Product level	Tech Pivot	1		1				2
	Side project Pivot	1						1
	Zoom-out Pivot				1	1		2
Market level	Customer need Pivot	1						1
	Customer Segment Pivot			1				1
	Channel Pivot				1			1
Stategy level	Value Capture Pivot		1		1			2
	Complete Pivot		1				1	2
	Engine of Pivot			1				1

	Business Ecosystem Pivot					1		1
No. of pivots per company		3	2	3	3	2	1	14

Product level pivot

In the Product level pivot category, Tech pivot, Side project pivot, and Zoom-out pivots were the types identified in the interviews. Tech Pivot was mentioned by the founders of Company A and Company C.

"*We are adding an AI function in the new version of the coming application. Such a function helps individual users get their homework or mock tests graded. Furthermore, it also helps to provide a customized textbook for everyone based on their English levels and learning area which needs improvement. It completely leverages our e-learning services to cater to individual needs*".

- Company A

"*We had to redesign the engineering model so that it did not need such huge amounts of data (as it used to be) while still ensuring the quality of the result and the SLA that we already committed with customers and partners*."

- Company C

Likewise, Zoom-out pivots are mentioned in the interviews with company D and company E.

"*Within only three days of situation consideration, we already decided to leverage both technical resources and a financial investment of approximately $500,000 to invest in the storage-related cloud services. Such quick and bold action is obviously required so that we are able to catch such a rare opportunity. As a result, we can meet this customer's need. And now, based on that successful experience, besides Content Delivery Service modules, we also offer new Storage Cloud services for*

other customers. We succeeded in opening new business lines in a very short period."

- Company D

"*During the first year after establishment, we were lucky enough to be able to build up the first MVP and also signed a contract with the first customer. Together we were refining MVP during the project. However, as the project went on, I realized that the customer was unable to leverage our solution as their supported infrastructure was not big enough. To optimize our loyalty system (first MVP) for their benefit, they need a lower layer of marketing technology system that they had not deloyed yet. We decided we had to make a second MVP with wider layers […] In other words, it's like a bigger solution with more comprehensive layers so that customers with the same level of our first customer's infrastructure can still take advantage of our solution right away.*"

- Company E

The less-mentioned type of Product level pivot in the interviews was Side project pivot. Only Company A had such an experience: During the Covid-19 pandemic, all other activities of the company were closed because of the strict lockdown in Vietnam, but the demand for e-learning was dramatically booming. The company's founder, on reflecting back on that period in Vietnam during the interview, recognised that such a demand growth was reasonable, though unfortunately, not predictable. People were bored at home and wanted to spend their free time learning something new. It was still a grand opportunity for the company to meet with a huge demand when other services brought minimal revenues. Company A quickly mobilized all of its resources into e-learning.

Out of 4 types of Product level pivot, Zoom-in pivot was the only type not observed in the interviewed sample.

Market level pivot

The Market level pivot category accounted for the fewest number of adopted pivots the interviews, mentioned in only 3 cases (Company A, C and D); each of these 3 companies chose a different pivot type in this category.

Customer Need Pivot of Company A was identified via the company's move to customise its product and marketing plans to suit the Vietnam market and customers base preferences, instead of using the initial/base one that the Company has been applying in other markets (China and UK). Meanwhile, the Customer Segment Pivot in Company C was described as follows by its lead data scientist: "*We needed to open the new market as the current one is already stagnated*". As for Company D, the founder commented: "*We opened the oversea branch in Singapore and is trying to set up a distribution channel for our solution through the system and solution integrators in the market*" – this implied the adoption of a Channel Pivot.

Strategy level pivot

Strategy level pivot category contained the highest number of types of undertaken pivots in this study: Value Capture Pivot, Complete Pivot, Engine of Pivot, and Business Ecosystem Pivot. Value Capture Pivot and Complete Pivot were identified in 2 different companies in the interview (the former type in Company B and D, while the latter type in Company B and F). In total, 6 Strategic-level pivots were witnessed in this project.

A remarkable finding was seen from Company F, who has experienced only 1 pivot. This was however a Complete pivot, one of 2 pivots of this type in the whole sample. Company F decided to move from a marketing technology solution provider for banking sectors to data consulting and geographical software company targeting forestry customers. Its business model completely changed with this pivot, whether at product, market, and/or strategy levels.

Beside the Complete pivot in Company F, such a critical/ radical pivot was also experienced by Company B, a Gamefi developer and publisher in the hope of leaving disappearing markets for more optimistic fields: "*Gamefi is out of trend now…We must change to different type. In the blockchain, it is now meme coin on the trend. We allocated some resources to meme coin and piloted the rest to different potential types (technology level), even for technical resource outsourcing (market level change from developing and publishing). We could not depend on gamefi (strategy level) as the numbers are very negative*".

Company C was the only one in which an Engine of Pivot was observed. The founder shared some details on this decision: "*Instead of engaging in pricing war,*

we decided to provide more services with additional scope of work to current customers like SLA increasing, more check times in order to keep customer retention without pricing change".

Meanwhile, understanding limitations associated with short age such as unfamiliarity of the brand name and lack of experience, Company E needed to have a strategic alliance with bigger players like Gimasys in order to access targeted B2B2C customers and gain contracts. Their actions implied an adoption of a Business Ecosystem Pivot.

4.2. External triggering factors of the interviewed software startups of Vietnam

In the interviews, both internal and external types of reasons for pivots were observed. Among 18 identified pivot-triggering factors, external factors played a greater role, driving 14 pivots, while internal factors had a more modest role, mentioned in only 4 pivots. A significant remark was that in 10 out of 14 pivots, each pivot was associated with a single cause (factor). Meanwhile, the remaining 4 pivots were triggered by 2 factors. In **Table 6**, internal factors, which were not the focus of this project, were in Italic to emphasise the roles of the remaining external factors.

Table 6: Identified pivot types and their triggering factors

Company Code	**Pivot**	**Factors**
Company A	1a. Tech Pivot	1a. Technology challenge (F2) + Competition (F3)
	1b. Side project Pivot	*1b. Side project success (F10)*

	1c. Customer need Pivot	1c. Customer feedback (F1)
Company B	2a. Value Capture Pivot	*2a. Business Financial (F11)*
	2b. Complete Pivot	2b. Market condition (F6)
Company C	3a. Tech Pivot	*3a. Legal Issue (F8)*
	3b. Customer Segment Pivot	3b. Market condition (F6)
	3c. Engine of Pivot	3c. Competition (F3)
Company D	4a. Zoom-out Pivot	4a. Market condition (F6) + *Strategic longevity (F14)*
	4b. Channel Pivot	4b. Market condition (F6)
	4c. Value Capture Pivot	4c. Competition (F3)
Company E	5a. Zoom-out Pivot	5a. Customer Feedback (F1) + *Flawed business model (F9)*
	5b. Business Ecosystem Pivot	5b. Market condition (F6)
Company F	6. Complete Pivot	6. Unscalable business (F4) + Wrong timing (F5)

The Tech Pivots have been analyzed in the above findings in the cases of company A and D. For example, the technological challenge motive behind Company A's pivot was presented in the interview:

"AI is really something now. It is not on the news and really around you […] The e-learning market in Vietnam is highly competitive with various competitors, from the big ones like Apollo, ILA to smaller local ones...Based on our research, several rivals like IELTS Fighter and Ms. Hoa's IELTS are developing AI functions in their application and e-textbooks, so we are already doing it now. Otherwise, we are soon out of trend".

- Company A

Market conditions (F6) was the factor which triggered different pivot types in Company B, C, D and E. For example, the founder of Company D elaborated on this pivot as follows:

"Because of the Covid lockdown, all our traditional customers had to shrink their business when offline activities were highly restricted […] There was a huge demand for e-learning when all schools were forced to move online. Such demand required a great capacity of storage solutions on the cloud for such customers to provide e-learning-related services, which traditionally and currently available cloud service providers, including ours, could not meet. Therefore, we decided to react very soon to catch such demand".

- Company D

Company D invested in a new line of business (storage-related clouds) besides their current main offerings (Content Delivery Network service) in order to offer unique solutions to customers' sudden demands. Such move distinguished them from other competitors and secured their new contract. Furthermore, this Tech Pivot also helps company D open a new line of business as analyzed in the previous section.

Meanwhile, in the case of company E, Customer feedback and Market conditions triggered 2 types of pivots:

"After establishing the first year, we were lucky enough to build up the first MVP and signed the contract with the first customer. Together we were refining MVP during the project. However, as the project was ongoing, the customer could not leverage our solution as their supported infrastructure was not big enough. To optimize our loyalty system (first MVP) for their benefit, they need a lower layer of marketing technology system that they did not deploy yet". Customer feedback (F1) is recorded besides the flawed business model (F9) is also noticed by sharing: "it took us a lot of resources to support and fix the solution when customer scaled up. We decided to make a MVP number 2 with wider layers…."

- Company E

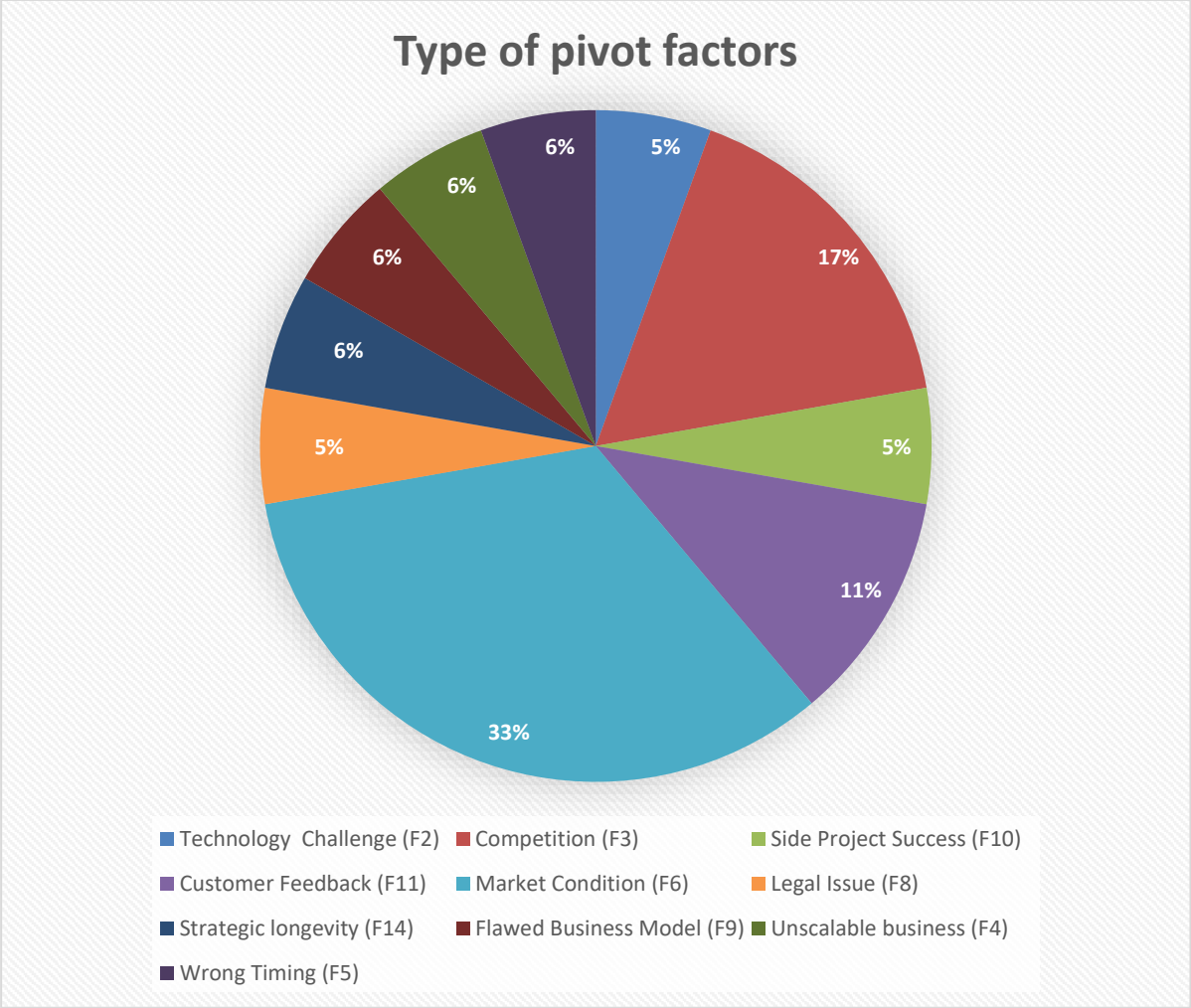
The co-founder of company F mentioned the decision to pivot from Marketing Technology solution provider for the banking sector to a Lumbering management and data consultation company because of the wrong timing (F5) when they started the business during the hard time of business downtrend in Vietnam. All of their banking sector customers had to slash the budget, especially concerning long-term strategic investment. Besides such factors, during the pitches with big banking accounts, they realized they wanted their in-house tech team to build up and control their MarTech efforts instead of leaning over an outsourcing company. Clearly, they also pivoted because their potential customers were not engaged, and their original business could not scale up. Such unscalable business reason (F4) contributed to their complete pivot when the alternation happens at all levels: product, market, and strategy.

4.3. Discussion

Out of 14 pivots undertaken by the sampled software startups, 10 types of pivots belonging to 3 pivot categories were identified (**Figure 2)**. Based on the number of pivots adopted, it was seen that Strategic level pivots occurred most frequently (6 pivots), followed by Product level pivots (5 pivots), and finally Market level pivots (3 pivots). No Team level pivot was identified. Only one startup pivoted only once, while the other startups had adopted more than 1 pivot. In the companies who have pivoted more than once, although the pivots may fall in the same pivot category,

they were never the same type; in other words, each time an interviewed startup pivoted, the selected pivot type was different from the earlier one(s).

Figure 2: Type of pivot factors



Pivots happen in every startup with experienced differences. 5 companies went through several times of pivots, and only 1 company F just observed once. Such findings represent like international counterparts, Vietnam software companies also frequently operate in an environment of great uncertainty and lack prior knowledge about their target audience. Although they are solving an issue, their target audience may not be as interested as they first thought. Startups test their ideas, learn from their mistakes, and refocus on the real needs and appropriate client groups.

In the antecedent factors of such pivots, both internal and external causes also observed, however, there is a big unbalanced between external reason against

internal elements (13 against 5 factors). The most frequent external factor is market condition (F6) which happened in 6 cases (accounts to 33% of total factors). In comparison, in 4 cases of internal reasons, they vary from each other, namely: Side Project success (F10), Business Financial (F11), Legal Issue (F8), Strategic Longevity (F14), and Flawed Business Model (F9). Interestingly, when analyzing internal and external reasons under the framework of the PESTEL model, macro-factors play a big major in such kinds of pivots.

Notably, the Political factor does not directly affect to the reason it pivots. It influences how company D pivots. In his sharing, the founder and CEO mentioned: "Due to the ongoing territorial dispute between China and Vietnam, there was a boycott practice in Vietnam customers to any company have any relations to China. In many tenders, they even tried to remove such China-related products and services through many technical barriers. Hence, when choosing the partners for our channel distribution, we carefully consider the case of BytePlus, one of TikTok affiliates. We were afraid that our current customers of the main segment, mainly state-owned media companies, might boycott us. Hence, the way we partner with BytePlus is very thoughtfully limited". Such findings suggest an important role of political reasons not only in why but also in how a software startup pivots,

The economic factor is affected directly in 1 case of pivot, which takes to 5.6% total of the recorded cases, when "economic downtime in Vietnam makes banks slashed their budget, they unprioritized such long-term project like MarTech instead of day-to-day operation activities" as shared by CPO of company F. In this case, the economic reason is the direct reason of the wrong timing for their startup aiming to provide MarTech to banking customers in Vietnam.

This aspect of the overall environment encapsulates the demographic traits, social mores, and cultural norms of the people that the organization serves. This encompasses demographic trends like population growth rate, age and income distributions, career attitudes, emphasis on safety, health awareness, lifestyle attitudes, and cultural obstacles. When marketing to specific customers, these criteria are very crucial. It also reveals the local workforce's readiness to labor in particular circumstances.

These factors are the most significant antecedent elements recorded in the study. The table below illustrates these factors' influence on 3 identified pivots (equivalent to 16.67% of total observed cases).

Company Code	**Pivot**	**PESTEL - Sociocultural Factors**
Company A	1b. Side project Pivot	1c. Side project success: Covid lockdown significantly surged the demand of online learning and slashed all other offline business lines
	1c. Customer need Pivot	1c: Customer feedback: Marketing and Learning content needs to be tailored with Vietnam customer base when young customers in Vietnam don’t get used to with paid online service and their yearly income is not high
Company D	4a. Zoom-out Pivot	4a. Market condition (F6): Covid lockdown cut almost traditional customers' activities and unexpectedly created huge demand on Storage cloud solutions for e-learning and online courses (when all schools are forced to teach online)

from company C, a person credit scoring provider, because of Legal Issue (F8), its lead scientist shared that in the alternative credit scoring, the models used to be built on the acquired non-conventional data like household electric or water bills, personal telecommunication bill, or personal data extracted from social platforms, etc. The Vietnam Government used to have loose regulations on such of privacy

data handling matters. However, since 2021, privacy data handling regulations were tightened; such data was illegal if any third-party company like company C used it without an individual customer's consent. Hence, they and all other players must redesign the whole model with a limited type of such data dependencies to abide by the laws.

Table 7: Some macro-level factors which could trigger pivots in software startups.

PESTEL aspects/ Groups of triggering factors	**Factors**
Political environment	Governmental agencies as incubators; conducive policies and regulations; administrative burden or government's intervention in markets
Economic	Economic policies which affects costs or revenues
Catastrophe-related triggers	Corona virus

V. Conclusion:

In conclusion, this thesis delved into the topic of software startup pivots and the antecedent factors that influence pivots in Vietnam. Through the research method of conducting interviews with six startups in Vietnam, several key findings have emerged.

Firstly, the trends of pivots in Vietnam align with previous research conducted in other countries. This suggests a universality in the reasons and motivations behind startups' decisions to pivot. The study confirms that startups in Vietnam, like their counterparts in other nations, undergo pivots as a strategic response to various challenges and opportunities.

Secondly, the research highlights the significant role played by macro-level factors in the decision-making process of pivots. These macro-level factors encompass both internal and external aspects and have been well-documented in existing studies. However, this research presents an important addition to the existing knowledge by proposing the inclusion of a catastrophe-related factor. This factor recognizes the impact of unforeseen events such as the Covid-19 pandemic or war, which can act as triggers for startups to pivot their business models.

By identifying a total of 15 factors, including the newly suggested catastrophe-related factor, this study provides a comprehensive framework for understanding the antecedent factors that influence software startup pivots in Vietnam. These factors encompass a wide range of influences, such as market conditions, competitive pressures, technological advancements, financial constraints, and now, the potential disruptions caused by catastrophic events.

Recommendation

Moreover, the findings of this research provide practical implications for stakeholders within Vietnam's startup ecosystem.

Policymakers, investors, mentors, accelerators, and other support organizations can leverage the knowledge generated to tailor their strategies, programs, and interventions to the specific needs of startups in Vietnam. This can foster a more

nurturing and conducive environment for startups to thrive, innovate, and successfully navigate the challenges they encounter.

Organizations involved in supporting and training tech startups, including tech transfer officers, accelerators, and government initiatives, can derive benefits from the enhanced comprehension of pivot types and factors influencing pivots developed through this study. These findings can be incorporated into the knowledge base and training programs of these organizations, thereby improving the support they provide to startups.

Mentors, coaches, advisors, and non-executive directors who offer guidance and support to tech startups can integrate the evidence-based findings from this study into their support frameworks. By doing so, they can enhance the likelihood of startups' survival and success by incorporating strategies and insights derived from the study's findings.

The financial investment community, including venture capitalists and angel investors, can consider the impact of entrepreneurial pivoting on investment decisions. They can assess whether a startup has pivoted or is on the verge of pivoting when determining when to invest, taking into account the potential implications of pivoting on the investment proposition.

Events and conferences focused on enhancing our understanding of technology entrepreneurship can consider increasing the emphasis on empirical studies related to entrepreneurial pivoting, as well as other aspects of the startup journey, such as Minimum Viable Product (MVP) and Business Model Lifecycle (BML). By elevating the attention given to empirical studies on pivoting, these events can provide a platform for researchers and practitioners to share insights and contribute to the collective knowledge in the field of technology entrepreneurship.

One of the limitations of this thesis is the use of a qualitative research method with a relatively small sample size of only six startups. While qualitative research provides in-depth insights and allows for a detailed exploration of the research topic, the small sample size may limit the generalizability of the findings to the broader population of startups in Vietnam. The findings may be more specific to the interviewed startups and may not fully reflect the experiences of other startups in the ecosystem. To address this limitation and strengthen the validity of the

findings, future research could consider expanding the sample size by including a larger number of startups. This would provide a more comprehensive and diverse perspective on the factors influencing pivots.

Despite this limitation, the qualitative approach employed in this thesis offers valuable insights and a rich understanding of the factors driving pivots in Vietnam. The findings can serve as a starting point for further research and can provide valuable qualitative evidence to complement future studies with larger sample sizes or quantitative methods.

APPENDIX 1

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APPENDIX 2

Interview Questions

Four question categories were covered in the interviews: firm growth path, pivot points, antecedents to pivots and classify the type of factors, and the consequences encountered after pivots . Questions about the observed Business Model influence were also explored in the final section.

Part I: Background questions:

Can you introduce yourself and your company? (Position and the primary background)

What is the status of the company?

What is its position in the industry?

Part II: Pivot relating questions:

Since the establishment of your company, how many times have you faced difficulties?

Part III: Condition of the pivot:

If possible, can you tel me more about these conditions? (Digging-in to find out type of challenges)

What do you think you would change such condition? Is it out of your company's control? (Aim to find challenges are internal or external and it belongs to marco factored or not)

Part IV: The result of the pivot:

What do you do in the future to cope with this condition?

What is your plan for your company?

APPENDIX 3

Interview Guide

The purpose of the interview:

The interview aims to gain insightful and practical experience with active software startups about the pivot decision. Besides the internal factors contributing to the decision to pivot discussed in several works of literature on startup pivots, my research is more interested in the macro-factors triggering the strategic process. Your approval for the interview and valuable feedback will allow me to clear up this current mist.

Explanation of the key terms in the interview

Software startups:

Software startups are companies positioning software as their main value proposition with innovation focus, lack of resources, working under uncertainty and time pressure, and rapidly evolving. It has been reported that few software startups can develop products or services right in the beginning, and their products/services usually differ from what they plan to build in the inception phase. The expectation on competing products/ services and ability to grow quickly leads to the possibility that software startups can change their strategy more frequently or make a pivot.

Some examples of software startups:

Global level: Twitter, Instagram, Flickr, Facebook

Norway level: Kahoot, Hoopla, Dogu, Voico

Vietnam level: Zalo, Axie Infinity, Misa, Hibox

Pivot:

A pivot occurs when a startup shifts its core focus and changes direction in a fundamental way. Twitter, Instagram, and Flickr, to name a few, are examples of software companies that evolve through their early stages in several successful pivots. Twitter, before being famous as a mini-blogging service, their original product was podcast services. While Instagram chose to focus more on the photo

sharing application, a function of their first inception of location-based service when they were known as Burbn company. In their own pivot case, Flickr changed themselves from the developer of a massive multiplayer online role-playing game to a platform for users sharing their own photos.

Macro factors:

The model examined in the present macro factor study is PESTEL (Political, Economic, Socio-cultural, Technological, Environment and Legal) analysis. The model examined in the present study is PESTEL PESTEL analysis serves two primary purposes for a company. Firstly, it helps recognize the operating environment in which the company exists. Secondly, it offers data and information that can assist the company in anticipating and preparing for potential situations and circumstances that may arise in the future.

Method of interview:

Research on the phenomenon of pivots is still in its infancy (Bajwa et al., 2017; Terho et al., 2015). A qualitative study methodology is adopted to comprehend the causes and effects of technological pivots in software companies. Our study uses a multi-case embedded inductive research design. This kind of approach is appropriate in research setting when asking open-ended questions is crucial for developing a thorough understanding of the subject. It enables in-depth examination of the causes and effects as well as comparison of findings among software startups to improve the results' external validity (Yin, 2009). Additionally, it confirms how the observed consequences' influence on the business model was derived. A case study procedure and database were established in the first step.