

# Exploring entrepreneurial pivoting and the factors that trigger pivots by tech startups

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**Abstract**—Technology entrepreneurship is an emerging domain in the field of entrepreneurship and the practice-oriented method called the Lean Startup approach (LSA) has made a big impact in this area. However, many technology startups continue to have survivability issues. This study focuses on understanding the theory of entrepreneurial pivoting and its associated factors. In this study, we have collected secondary data comprising 80 tech startups to validate the different types of pivots they pursued by the companies and the factors that triggered the pivoting. The most common pivots among these were found to be customer segment pivot and customer need pivot.

**Keywords**—Lean Startup approach; pivots and factors; technology entrepreneurship.

## I. INTRODUCTION

The Lean Startup approach (LSA) is considered as one of the most popular practitioner-oriented approaches in the entrepreneurship literature. This approach describes various aspects including validated learning or customer development, minimum viable product (MVP), market opportunity navigation, perseverance and pivoting. Blank (2013), Ries (2011), and Osterwalder & Pigneur (2010) are considered as critical contributors to the LSA concept as their books on the subject have been sold in the millions and the practices adopted by countless entrepreneurs. However, in the field of entrepreneurship there remains a gap between academic research and practitioners. On the one hand, practitioners do not necessarily pay much attention to research studies and on the other hand, there is a need for research to fully characterise the entrepreneurial process [1].

Technology advancement is considered a critical aspect of economic growth as industries develop through innovating, exploiting and commercialising emerging technologies. Entrepreneurship has many domains, and one such domain is technology entrepreneurship (TE), which is defined as assembling resources, technical systems and the strategies by an entrepreneur to pursue opportunities [2]. TE has also been described in terms of digital entrepreneurship [3].

This exploratory research study focuses on understanding the concept of technology entrepreneurship in the context of the Lean Startup approach and entrepreneurial pivoting by startups. The study seeks to validate the type of pivots pursued by tech startups and the factors that trigger pivots.

## II. LITERATURE REVIEW

### A. Technology entrepreneurship

The universal definition of entrepreneurship is the “creation of new enterprise” [4]. It can also be explained as the process of extracting revenue from new and distinctive amalgamations of resources in an uncertain environment. Entrepreneurship is considered as a positive force that contributes to the growth of both developed and developing economies. Furthermore, entrepreneurship has played a significant role in exploiting technological innovations [3]. It can be observed that researchers in the field of entrepreneurship seek to address questions such as the following: How do entrepreneurs create value propositions? Why do some startups fail to become sustainable in the long run? How does an entrepreneur decide whether or not to persevere or pivot? [5], [6]. Entrepreneurship has sub-branches and arguably technology entrepreneurship is one of the essential fields. Indeed, Spiegel and Marxt [2] defined “Formation” and “Exploitation” as crucial phases of TE. The first phase is formation, which involves the recognition of opportunities. Exploitation is the second phase where strategies are developed to exploit the recognised opportunities. TE has a third phase known as “Renewal”. Moreover, Eliakis et al. [3] defined technology entrepreneurship as developing innovative digital technologies or using such technologies by forming new startups and transforming existing businesses.

Technology entrepreneurship does not necessarily mean just adopting digital technologies by technology startups; it acts as an interface between innovation and entrepreneurship. Innovation can be defined as a degree of newness by generating ideas, processes, products, or services that enable a technology

breakthrough. Furthermore, entrepreneurship is inferred as exploring and exploiting business opportunities to create a value proposition. The domain of TE can be characterised through the following: a) science and technology policies; b) exploration and fostering of new technologies across various industries; c) government support to science and technology to stimulate new technologies; and d) market regulations that govern the entrepreneurial initiatives [7]. Technology entrepreneurship has gained both academic and policymakers' interest over the last two decades. Leading entrepreneurs such as those that founded major tech companies in the Silicon Valley area in California (USA) were able to succeed due to identifying and evaluating opportunities to create value propositions enabled through emerging technologies. However, researchers like Sobel and Clark [8] argue that even though TE is widely recognised, it still lacks a unified framework [9]. Furthermore, TE has evolved further and broadened through assimilation and evolution of new topics in the literature on entrepreneurship. One such new topic is product or service development based on customer feedback, which has been considered as the need to "probe and learn the process" [10].

### B. Entrepreneurial pivoting

During the inception and launch phases, a tech startup undergoes frequent changes in the business model and the value-capturing technique due to resource scarcity and external market conditions. In this regard, startup companies can adopt the Lean Startup approach. The global manufacturing industry adopted the principles of lean philosophy over the last several decades. The five principles of lean are as follows: a) creating value to the customers; b) identifying the value stream; c) creating a process flow to prevent breakdowns, re-entrant loops, low-quality products or services; d) producing high-quality products that are efficient and valuable for the customers; e) identifying and eliminating excess engineering hours in order to be cost-effective [11].

Startups are defined as a group of talented people trying to seize an opportunity by turning an idea into a product [12]. An entrepreneur may encounter a question, i.e., whether to persevere or pivot while commercializing their idea to develop a competitive product or service. Eric Ries author of *The Lean Startup* and an entrepreneur defined the pivot as a "structural course of correction designed to test a new fundamental hypothesis" [13]. He says entrepreneurs should pivot from time to time to learn the customers' needs, problems, and preferences to develop a market-fit product or service [14]. The LSA model emphasises experimental entrepreneurship to explore opportunities, which can be viewed as an active search and iterative design solution. In such a case, companies such as GE, Motorola, Searle and Corning are some of the examples that have followed the probe and learn process [15]. For any organization, continuous innovation will help develop new ideas, products, and organizational structure to support long-term goals. Those strategies help to further build the success of

companies. It has been reported that Facebook and Twitter are two classic examples of pivoting [13].

A total of fourteen pivots have been identified from the literature [12, 13, 16] that are further categorized into four levels, which are as follows: Product level pivots are those that lead to a change in the products/services offered by the company (1). Market level pivots focus on customers and the market in which a company operates (2). Strategy level pivots focus on the way to generate more value for the company (3). People level pivots are associated with resources in a startup (4). Table I illustrates all the pivots categorized under the above four levels.

TABLE I. TYPES OF PIVOTS. SOURCE: [12, 13, 16]

S. No	Level	Name of pivot	Source
I	Product level pivot	Zoom-in pivot	Ries [13]
		Zoom-out pivot	
		Technology pivot	
		Platform pivot	
II	Market level pivot	Customer segment pivot	Ries [13]
		Customer need pivot	
		Channel pivot	
		Market segment pivot*	Bajwa [16]
III	Strategy level pivot	Value capture pivot	Ries [13]
		Business architecture pivot	
		Engine of growth pivot	
		Complete pivot	Bajwa [16]
		Side project pivot	Bajwa [16]
IV	People level pivot	Social pivot	Hirvikoski [12]

\* Name changed from zoom-in pivot to market segment pivot

The market segment pivot (name changed from zoom-in pivot to avoid confusion), complete pivot and side-project pivot were identified by Bajwa [16]. The social pivot was identified by Hirvikoski [12], and the remaining ten pivots were identified by Ries [13]. Furthermore, Bajwa [16] identified eleven factors may trigger a startup to change its direction (pivot). Table 2 illustrates all of these factors.

TABLE II. FACTORS THAT TRIGGER PIVOTS. SOURCE: [16]

S. No	Factors
I	Customer feedback (positive and negative feedback)
II	Technology challenges
III	Competition
IV	Unscalable business
V	Wrong timing
VI	Market conditions
VII	Influence of investor, partner or founder
VIII	Legal issues

S. No	Factors
IX	Flawed business model
X	Side project success
XI	Business financials

### III. RESEARCH APPROACH

The objective for this research study is to validate the type of pivots pursued by startup companies and the factors that trigger such pivots. In order to address this objective, we collected secondary data from various academic journals and company websites. Secondary data is a dataset that a researcher does not collect by him/herself but instead analyses existing data [17]. The benefits of using secondary data are eliminating financial and logistical obstacles while collecting primary data [18]. However, certain precautions must be taken. A researcher should elucidate the limitations using secondary data and explain the actions taken to use the original data set for the new research gap. The secondary data should be conscientiously interpreted to generate a hypothesis and not to prove hypothesis [17], [18].

As part of the secondary data collection, we reviewed academic articles [16, 19, 20] that discuss different types of pivots and possible factors behind pursuing those pivots. At the same time, we have searched the internet to identify technology startups/companies that have pivoted. Examples of the search keywords used in the internet search are as follows: “business pivots”, “pivots by startups”, “famous business pivots” and “pivots”. While looking for data, we focussed only on tech startup companies to understand what type of pivots they have pursued. The intention behind collecting the secondary data is to understand what type of pivots have been pursued by technology startup companies. The secondary data was collected from multiple sources (academic articles and different websites), out of which 60% was collected from Bajwa et al., [14], 30% was from the internet (different websites searched in google) and the remaining 10% was from Comberg et al. [19], Terho et al. [20] and Hirvikoski [12]. We collected data of startup companies from across the globe and this includes startups from Canada, Finland, France, Germany, India, Ireland, Israel, Japan, Mexico, Republic of Tunisia, Spain, UK and USA.

The secondary data study shows what type of pivots pursued by tech startups/companies and how successful they are after pivoting. Tech companies such as Twitter and Facebook are international examples that pivoted at a very early stage of their journey [12]. During data collection, we came across websites that illustrated the startup companies that pivoted to face pandemic situation caused due by COVID-19. We studied the types of pivots those tech startups pursued and labelled their factor as market condition (due to pandemic).

Table III provides the details of companies that pursued pivots and the factors that trigger pivots. We have anonymized the company names.

TABLE III. COMPANIES WITH PIVOTS THEY PURSUED AND FACTORS ASSOCIATED WITH THOSE PIVOTS. SOURCES: [12, 16, 19-34]

Company	Factor (s)	Pivot (s)
Company-1	Influence of investor, partner or founder	Platform pivot
Company-2	Customer feedback (positive)	Platform pivot
Company-3	Market conditions (due to pandemic)	Platform pivot
Company-4	Market conditions (due to pandemic)	Value capture pivot
Company-5	Customer feedback (negative)	Zoom-in pivot
Company-6	Unscalable business	Customer need pivot
Company-7	Flawed business model	Zoom-out pivot
Company-8	Influence of investor, partner or founder, flawed business model, market conditions, business financials and technology challenges	Customer segment pivot, business architecture pivot, value capture pivot and engine of growth pivot
Company-9	Customer feedback (negative)	Customer need pivot
Company-10	Unscalable business	Customer need pivot
Company-11	Legal issue	Complete pivot
Company-12	Wrong timing and unscalable business	Customer need pivot
Company-13	Flawed business model	Customer segment pivot
Company-14	Influence of investor, partner or founder, flawed business model, market conditions, business financials and technology challenges	Customer segment pivot, channel pivot, engine of growth pivot and value capture pivot
Company-15	Unscalable business	Zoom-out pivot
Company-16	Market conditions (due to pandemic)	Value capture pivot
Company-17	Market conditions (due to pandemic)	Complete pivot
Company-18	Customer feedback (negative) and flawed business model	Complete pivot
Company-19	Customer feedback (positive)	Customer segment pivot
Company-20	Market conditions (due to pandemic)	Customer segment pivot
Company-21	Customer feedback (positive)	Zoom-in pivot
Company-22	Market conditions (due to pandemic)	Complete pivot and business architecture pivot
Company-23	Competition	Zoom-in pivot
Company-24	Side project success	Side project pivot
Company-25	Market conditions (due to pandemic)	Platform pivot
Company-26	Customer feedback (negative) and flawed business model	Customer need pivot and customer segment pivot
Company-27	Side project success	Side project pivot
Company-28	Market conditions (due to pandemic)	Market segment pivot
Company-29	Unscalable business	Customer need pivot
Company-30	Market conditions (due to pandemic)	Business architecture pivot
Company-31	Flawed business model, technology challenges and unscalable business	Zoom-out pivot, platform pivot, customer segment pivot, channel pivot and business architecture pivot

Company	Factor (s)	Pivot (s)
Company-32	Customer feedback (positive)	Market segment pivot
Company-33	Market conditions (due to pandemic)	Customer need pivot
Company-34	Customer feedback (positive)	Zoom-in pivot
Company-35	Customer feedback (negative)	Customer need pivot
Company-36	Market conditions (due to pandemic)	Market segment pivot
Company-37	Customer feedback (negative)	Customer segment pivot
Company-38	Market conditions (due to pandemic)	Customer need pivot
Company-39	Market conditions (due to pandemic)	Side project pivot
Company-40	Side project success	Side project pivot
Company-41	Influence of investor, partner or founder, flawed business model, market conditions and technology challenges	Technology pivot, channel pivot, engine of growth pivot and value capture pivot
Company-42	Market conditions (due to pandemic)	Business architecture pivot
Company-43	Unscalable business and technology challenges	Zoom-in pivot, Zoom-out pivot and technology pivot
Company-44	Unscalable business and customer feedback (positive)	Complete pivot and customer need pivot
Company-45	Technology challenges	Technology pivot
Company-46	Flawed business model	Customer need pivot
Company-47	Unscalable business	Complete pivot
Company-48	Influence of investor, partner or founder	Complete pivot
Company-49	Influence of investor, partner or founder and side project success	Side project pivot
Company-50	Influence of investor, partner or founder	Customer need pivot
Company-51	Market conditions (due to pandemic)	Platform pivot
Company-52	Customer feedback (positive) and wrong timing	Zoom-in pivot
Company-53	Customer feedback (negative), unscalable business and competition	Complete pivot
Company-54	Customer feedback (negative)	Complete pivot
Company-55	Customer feedback (positive)	Zoom-in pivot
Company-56	Competition	Customer need pivot
Company-57	Customer feedback (negative) and influence of investor, partner or founder	Channel pivot
Company-58	Customer feedback (negative)	Zoom-in pivot
Company-59	Customer feedback (positive)	Customer segment pivot
Company-60	Influence of investor, partner or founder, flawed business model and business financials	Customer segment pivot, value capture pivot and engine of growth pivot
Company-61	Influence of investor, partner or founder	Complete pivot
Company-62	Unscalable business	Platform pivot
Company-63	Technology challenges	Platform pivot

Company	Factor (s)	Pivot (s)
Company-64	Flawed business model, business financials and market conditions	Zoom-in pivot, Zoom-out pivot, customer segment pivot and business architecture pivot
Company-65	Unscalable business and customer feedback (positive)	Customer need pivot
Company-66	Influence of investors, partners or founders	Side project pivot
Company-67	Unscalable business	Complete pivot
Company-68	Competition	Complete pivot
Company-69	Customer feedback	Customer need pivot
Company-70	Customer feedback (positive)	Zoom-in pivot
Company-71	Market conditions (due to pandemic)	Side project pivot
Company-72	Market conditions	Value capture pivot
Company-73	Technology challenges	Technology pivot and customer need pivot
Company-74	Customer feedback (positive)	Complete pivot
Company-75	Technology challenges	Technology pivot and customer need pivot
Company-76	Customer feedback (positive)	Customer need pivot
Company-77	Market conditions (due to pandemic)	Value capture pivot
Company-78	Market conditions (due to pandemic)	Platform pivot
Company-79	Customer feedback (negative) and wrong timing	Customer need pivot
Company-80	Side project success	Side project pivot and customer segment pivot

#### IV. RESULTS

The objective behind studying the 80 technology startup companies through collecting secondary data was to secure a more in-depth understanding of pivoting and its associated factors. While analysing the secondary data, we calculated across the 80 companies the number of times (and percentage) a pivot was pursued and number of times a factor triggered pivoting, which is provided in Table IV and V respectively. The bar charts (Fig. 1 and 2) are graphical representations of these tables. For example, the factor customer feedback was a driver for selecting a pivot by twenty-seven different startups. Of these twenty-seven startups, seven of them used zoom-in pivot; four startups pursued customer segment pivot; eight startups pursued customer need pivot; five startups pursued complete pivot while three startups pursued platform pivot, channel pivot or a market segment pivot.

TABLE IV. FREQUENCY OF PIVOTS PURSUED BY THE TECH STARTUPS

Type of pivots	No. of times pursued	Percentage
Social pivot	0	0%
Market segment pivot	2	1%
Complete pivot	8	4%
Technology pivot	9	5%

Type of pivots	No. of times pursued	Percentage
Zoom-out pivot	10	5%
Platform pivot	11	6%
Zoom-in pivot	13	7%
Channel pivot	14	7%
Business architecture pivot	14	7%
Engine of growth pivot	17	9%
Side project pivot	17	9%
Value capture pivot	21	11%
Customer need pivot	23	12%
Customer segment pivot	28	15%
<b>Grand Total</b>	<b>187</b>	<b>100%</b>

The bar chart in Fig. 1 represents the frequency of each pivot pursued by a tech startup. For instance, customer segment pivot was the highest pursued pivot (N=28, 15%). Customer need pivot is the second most pursued pivot among the 80 startup companies (N=23, 12%) followed by value capture pivot (N=21, 11%). Market segment pivot is the least pursued pivot (N=2, 1%). We could not identify a single tech startup that pursued social pivots in order to validate.

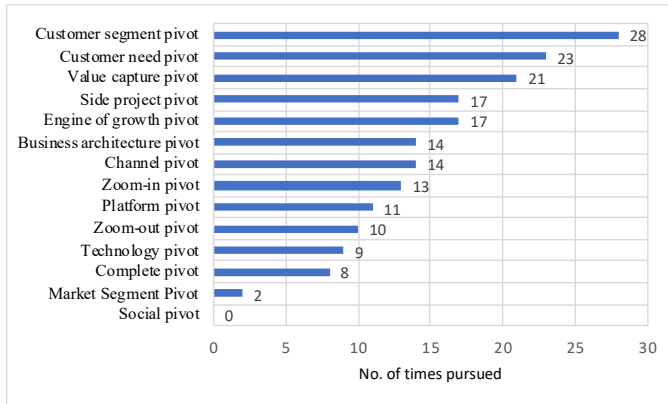


Fig. 1. Frequency of pivots pursued by the tech startups

TABLE V. FREQUENCY OF FACTORS THAT TRIGGERED PIVOTS

Factors	No. of times occurred	Percentage
Legal issues	1	1%
Wrong timing	3	2%
Competition	4	2%
Side project success	5	3%
Business financials	15	8%
Market conditions	17	9%
MC-Pandemic	19	10%
Unscalable business	20	11%
Influence of investor, partner or founder	22	12%

Factors	No. of times occurred	Percentage
Technology challenges	24	13%
Customer feedback	27	14%
Flawed business model	30	16%
<b>Grand Total</b>	<b>187</b>	<b>100%</b>

Fig. 2 illustrates the frequency of each factor that has triggered a tech startup company to pivot. For example, the bar chart shows that the flawed business model was the most triggered factor (N=30, 16%), followed by customer feedback (N=27, 14%) and technology challenges (N=24, 13%). Whereas competition (N=4, 2%), wrong timing (N=3, 2%) and legal issues (N=1, 1%) are the least triggered factors. Therefore, the customer segment, customer need, and value capture pivots are the most pursued pivots. Similarly, the flawed business model, customer feedback and technology challenges are the most triggering factors.

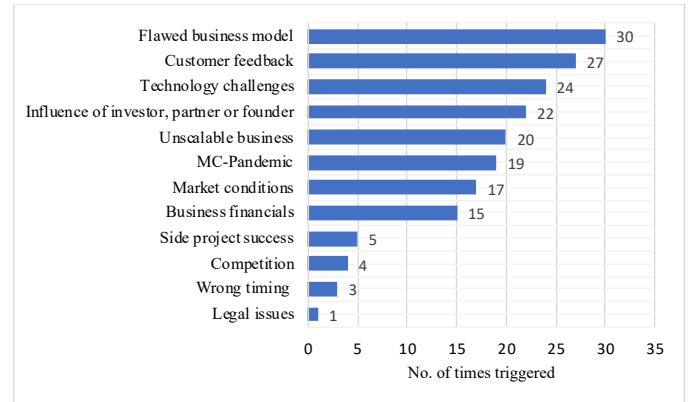


Fig. 2. Frequency of each factor that triggered the pivot

## V. CONCLUSION

This exploratory research study focuses on understanding the concept of technology entrepreneurship through examining the lean startup approach, pivots and the factors that trigger such pivots. Technology entrepreneurship is a critical field that can enhance economic growth and create new technology-driven market opportunities [3]. Therefore, the question arises: How can a technology startup company survive in the long run? One way to address the question is by implementing LSA. As the Lean Startup approach (LSA) encourages startups to interact with customers and promotes them to test new fundamental hypotheses to improve the product/service based on the feedback [35]. From the secondary data analysis, we observed that the most frequently pursued pivots are customer-oriented types of pivots i.e., customer segment pivot (15%) and customer need pivot (12%) followed by the value capture pivot (11%). However, we could not identify any examples for the social pivot which was proposed by Hirvikoski [12].

Pivoting is defined as changing the course of direction by a tech startup. Product, market, strategy and people level pivots are the four categories out of which a startup can opt a single pivot or multiple pivots to test their new hypothesis. However,

the following aspects are yet to be explored: How many times a tech startup has to pivot to identify a market fit product? Does a pivot lead to another pivot (i.e., a domino effect)? Whether there is a correlation between pivots and the factors? Therefore, future research should focus on collecting primary data to identify new pivots and factors, determine the domino effect, and the influence of pivoting on the value proposition.

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