The Role of Business Models in the Development of New Technology-Based Firms

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Abstract In the process of development of new technology-based firms (NTBFs), the crucial role belongs to establishing an effective and efficient business model to deploy the focal technology in a sustainable way. As such, it becomes clear that the business model design and testing/validation become the essential parts of a startup process; yet, so far, the topic of the business model in the context of NTBFs has received insufficient attention in the literature. Drawing on the basic theoretical and empirical insights from entrepreneurship and strategy research, this chapter scrutinizes the topic of the ontological nature of a firm's business model within the NTBF context, and its relatedness and distinction from strategy, technology, and innovation. From definitional issues, we proceed to discussing the role of the business model in the process of development of NTBFs. Then, we summarize the available empirical material to formulate the most frequently occurring problems with new ventures' business models that prevent their development, paying particular attention to ways of preventing and dealing with such problems. The developed conceptual framework of business model-related NTBF challenges is illustrated and corroborated with the mini-cases of technology ventures.

Keywords Business model · Key customer · Business model innovation · Technology-based firms · Business value · Customer value · Value matrix · Efficiency · Effectiveness

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1 Introduction

The construct of a business model has recently gained substantive attention in management literature and practice (Al-Debei & Avison, 2010; DaSilva & Trkman, 2014; Foss & Saebi, 2016; Massa, Tucci, & Afuah, 2016; Morris, Schindehutte, & Allen, 2005; Zott, Amit, & Massa, 2011). In its essence, a firm's business model is a system of organizational routines for creating economic value for the firm's stakeholders and capturing a part of this value for the firm itself and its shareholders (Osiyevskyy & Dewald, 2015a; Osiyevskyy & Zargarzadeh, 2015). In a narrower sense, a business model determines how the enterprise creates and delivers value to customers and then converts payments received into profits (Osterwalder & Pigneur, 2009). However, the customers and investors are not the only significant constituents of a business model. The recent managerial thinking stresses the crucial role of internal (e.g., employees) and external stakeholders (e.g., partners), particularly in creating the customer value. For example, Gassmann, Frankenberger, and Csik (2014) point out that "in addition to customers, other important actors such as suppliers, distributors, solution providers, or those participating indirectly such as researchers, consultants or associations, contribute in some significant way to creating value for customers. Such partners can inspire new ideas in much the same way as customers can, and may also be frequently instrumental in actually realising new concepts" (p. 121).

In other words, a business model refers to what the company offers, to whom it is offered, and how it can accomplish its goals on a routine basis. The business model is hence a predominantly internally looking construct (Massa et al., 2016), analytically independent of competitors and the current state of the market, which is where strategy comes in (Norén & Wang, 2010). The business strategy, on the other hand, describes how the company will engage with competitors, identify and segment customers, and respond to the market environment (Norén & Wang, 2010). The business strategy focused on creating and sustaining the competitive advantage determines the profit potential, yet this potential gets implemented through a properly established business model (Biloshapka, Osiyevskyy, & Meyer, 2016). A business model in itself can become a capability underpinning the firm's competitive advantage (Casadesus-Masanell & Ricart, 2010; Markides & Charitou, 2004), provided that a set of conditions are met (e.g., the VRIN framework of Barney, 1991). Thus, a company's strategy and business model are distinct yet obviously related constructs (Massa et al., 2016), each determining the ultimate financial performance through setting its potential (strategy) and realizing it with different degrees of effectiveness and efficiency (business model). In addition, the strategies of new technology-based firms set up their dynamic capabilities, determining by this means the dynamic boundaries for their business models; then, the companies implement their business models in the market (DaSilva & Trkman, 2014). Finally, the ability to scale up and/or internationalize a new venture has been shown to be determined predominantly by the characteristics of its business model (Hennart, 2014; Osiyevskyy, Troshkova, & Bao, 2018; Verbeke, Zargarzadeh, & Osiyevskyy, 2014).

Therefore, similarly to other enterprises in the market economy, in the process of development of new technology-based firms (NTBFs), the crucial role belongs to establishing an effective and efficient business model to deploy the focal technology in a sustainable way. As such, it becomes clear that the business model design and testing/validation become the essential parts of a startup process; yet, so far, the topic of the business model in the context of NTBFs has received insufficient attention in the literature—with the notable exception of Osterwalder and Pigneur (2009). To address this gap, drawing on the basic theoretical and empirical insights from entrepreneurship and strategy research, we discuss the nature of a business model construct and the developmental processes of business models' emergence in new ventures and startups. For the technology ventures research, we intend to provide essential insights regarding the role of firms' business models for securing Schumpeterian rents. Then, we will provide a summary of the available empirical material to formulate the most frequently occurring problems with new ventures' business models that prevent their development, paying particular attention to ways of preventing and dealing with such problems. The developed conceptual framework of business model-related NTBF challenges will be illustrated and corroborated with the mini-cases of technology ventures.

2 Business Models in New Technology Ventures

The essential characteristic of all technology ventures (either NTBFs or corporate ventures) is the primary focus on technological innovation. The key goal of a firm organized around an innovation is to find the right business model and, most importantly, the architecture of the revenue to capture value from that novelty (Teece, 2010; Zott et al., 2011). Hence, the role of a business model in profiting from an innovation is to ensure that the technological core of the innovation is embodied in an economically viable enterprise (Chesbrough & Rosenbloom, 2002). Firms can capture the value from a new technology in two basic ways: through incorporating it into their current business model, or through launching new ventures that exploit the technology in new business arenas (Chesbrough & Rosenbloom, 2002). A successful business model unlocks latent value from a technology, but constrains the following search for new, alternative models for other technologies later: consider, e.g., the rigidity problem of the established Xerox Corporation (Chesbrough & Rosenbloom, 2002) or General Electric before Jack Welch (Welch & Byrne, 2003).

Now, when we understand the primary role of a business model in NTBF development, it becomes clear that the business model design (Amit & Zott, 2015) and test/validation become the essential part of the startup process. Ultimately, the value of a new venture stems from a well-developed and validated business model, executed by a suitable founding team. A new venture's raison d'être is in offering a unique customer value proposition (or, more broadly, the value proposition to all key stakeholders), and then delivering on this promise. Only a differentiated,

technologically feasible, and economically viable offer will allow the new player to take part in the race on a par with the leaders.

From a design perspective, a new venture's business model is composed of three inter-related dimensions (George & Bock, 2011; Osiyevskyy & Dewald, 2015b): the value dimension (value proposition to key stakeholders); the transactive dimension (system of activities); and the resource dimension (approach to resource orchestration). To create a successful business model for a new technology-based firm, it is critically important to interlock the value of the product, market reaction, and capabilities of the company not only in the close, but in the future perspective.

Despite all the turbulence in today's business environment, the traditional understanding of a firm's strategy to achieve above-average returns remains unchanged: selecting target a market, defining products, services, and branding tactics to differentiate from competitors, with the ultimate goal of creating a clear and compelling customer value proposition. However, it is the business model that allows the firm to capitalize on that strategy. The business model is where the rubber hits the road and a strategy is transformed into revenue, operating profit, and ultimately customer and shareholder satisfaction.

3 Business Models: The Effectiveness/Efficiency Characteristics

The two key dimensions that describe how well a business model functions are customer value (effectiveness) and business value (efficiency) (Biloshapka et al., 2016). The 'customer value' dimension reflects the utilitarian views of the customers ('does the company actually deliver what is important for me?')—driven by an objectively attractive value proposition and full subjective appreciation of the benefits. The 'business value' dimension reflects the potential profitability of the business model, allowing the owners to benefit from the fair, above-the-average profit streams derived from delivery on the promise of the customer value proposition. The innovator trying to design a business model must also realize that the answers to the efficiency/effectiveness questions—how much business value and how much customer value is in the business model—are not always correlated. A firm can have a great customer value proposition that simply makes no money—an effective yet not efficient state. Conversely, it can squeeze profits from customers for only so long until they realize they are being used—an efficient but not effective state.

Juxtaposing these two dimensions yields the Value Matrix: a practical tool for diagnosing the current state of the affairs in the firm's business model (see Fig. 1).

The Loser quadrant includes the business models of those firms that fail to deliver either customer or business value; they create neither happy customers nor sufficient ROI. *The Taker quadrant* includes the business models of the companies that are hanging on to their prominent, profitable market position without actually providing

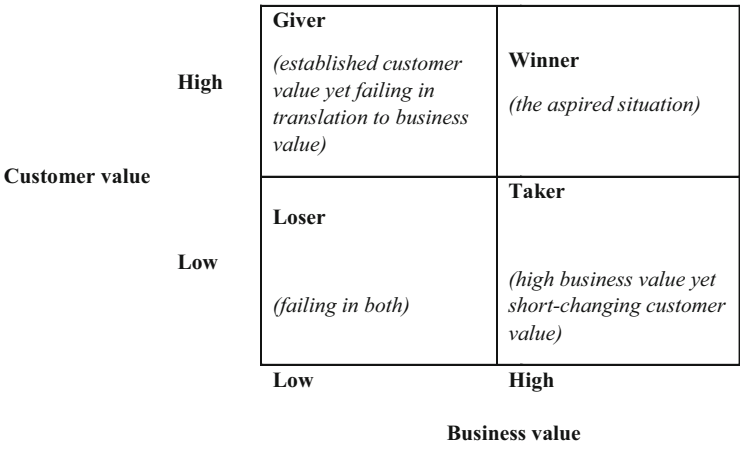

Fig. 1 Business model value matrix. Source: adapted from: Biloshapka et al. (2016)

or securing outstanding customer value, thanks to their high brand value, reputation based on past successes, or prohibitively expensive customer switching costs. This is a fragile position, likely leading to the Loser situation. Only market anomalies, such as a government-secured monopoly or other market distortion can allow a company to maintain this position profitably enough. The companies in the *Giver quadrant* appear to give more than they get, having a few happy customers but (usually) unhappy shareholders. Although their business models excel in customer value, the lack of adequate mechanisms for building business value prevents them from securing a fair share of the created value for the owners. The usual problem for Givers is failing to evaluate and charge for the true cost of delivery on their promises, resulting in costs exceeding the revenues, or simply low-quality delivery. Finally, the optimal and sustainable quadrant to be in is *Winners*, comprising the companies with high customer value—which results from addressing their customers' most important preferences—coupled with well-accepted and highly profitable delivery. Without deliberate efforts, no company can stay in the Winners quadrant forever, and a series of mistakes in terms of customer or business value can lead to slipping toward the Taker or Giver quadrants.

4 Business Model Evolution: Escaping the 'Giver Trap'

Hence, a firm's business model as a routinized pattern of activity of value creation and appropriation is not static, and as such must be viewed from the dynamic, transformational view of the business model evolution (Demil & Lecocq, 2010). In line with this reasoning, Osiyevskyy and Zargarzadeh (2015) conceptualized business model change as any alteration of the existing business model of a firm, either radical (major shift in one or more dimensions of a business model), or

incremental (progressive refinement of individual components). In terms of novelty, the general business model change concept includes both business model innovations ("new to the world" changes introduced in the industry for the first time) and imitative business model changes ("new to the firm" changes that copy approaches of competitors or firms from other industries). Business model innovations can be introduced in industries by entrepreneurial newcomers [either startups (Christensen, 1997) or diversifying entrants from adjacent industries (Tripsas, 1997)], or by entrepreneurial established players (Schumpeter, 1943). If the introduced business model innovation proves its potential, the remaining incumbents often learn about this, and respond by imitating and copying it (Casadesus-Masanell & Zhu, 2013). A useful classification of business model innovations was proposed by Giesen, Berman, Bell, and Blitz (2007), distinguishing among *enterprise model innovations* (changing the role of a firm in the industry value chain), *industry model innovations* (redefining the industry boundaries), and *revenue model innovations* (transforming product/service offering and pricing).

With an evolving business model, a company's position within the Value Matrix (Fig. 1) also changes with time (Biloshapka et al., 2016). After the initial stage, once the first customers are acquired and the first sales made, most technology ventures establish a business model of the Giver type—delivering the customer value at the expense of business value. This is a reasonable transitionary position, with the emphasis on gaining a customer base and a corresponding market share at the expense of profit. Yet, the first major obstacle such companies encounter is the need to eventually deliver on the business value, or monetize their business model. Unfortunately, escaping the "Give trap" does not happen automatically or smoothly, as illustrated by numerous cases of great companies with millions of happy customers yet zero or negative financial results (consider, e.g., WhatsApp or Viber).

5 NTBFs: Typical Business Model Problems

In this section, we discuss the particular business model-related challenges of technology new ventures, illustrating and corroborating them with the mini-cases of real companies. In its essence, moving from the Giver to Winner state requires the major improvement of the efficiency of a business model, or its ability to create business value without compromising the already superior customer value. The business value consists of two tightly coupled components: (a) delivery: quality of fulfilling the promise of the value proposition to the primary customer; (b) monetization: ability to charge customers a fair price, resulting in ultimate profit from the business model. The monetization component reflects the value appropriation function of a business model traditionally discussed in the academic literature (Zott et al., 2011). Yet, we argue that to fully explain the business value, the value appropriation (monetization) mechanism must be supplemented with its antecedent, high-quality value delivery, as without delivery no value appropriation can be performed in a sustainable manner. Similarly, the monetization is tightly linked

back to value delivery in a feedback loop, in that without the economic incentives the value delivery process cannot be sustained for a long time.

In what will follow, we will demonstrate the typical problems with improving the delivery/monetization processes (problems 1–4 below) and preserving simultaneously the sufficient level of customer value (problems 5–6 below).

The current paper is grounded in the empirical results of an ongoing longitudinal study (undertaken by the authors' team in the U.S., Canada, and Eastern Europe) aimed at exploring the structure, characteristics, evolution, and performance outcomes of organizational business models.

The research project comprises three major parts: (1) the quantitative study of diverse business models of a large number of established organizations (over 500 companies in the U.S. and Canada, in the sectors of real estate brokerage, higher education and banking); (2) the qualitative, longitudinal in-depth study of a small number of large corporations (in the U.S. and Eastern Europe—in industrial equipment, computer solutions, consumer products (food, alcoholic beverages), consumer electronics, pharmaceutical and business services industries); (3) the longitudinal in-depth study of a large number of startups (over 200, broad spectrum of industries) coming through a venture incubator in one of the major universities in Massachusetts. The employed data collection techniques are: survey (for part 1), interviews with top managers and owners (for parts 2, 3), and secondary data and archival analysis (for all parts). Although we arrived at the conclusions reported in this paper on the basis of analysis of empirical data from our sample, the focal problematic issues will be illustrated using the cases of prominent, well-known technology companies.

5.1 Problem 1: Low Value Recognition from the Customer Side

This problem implies the situation when a new technology-based firm has a value proposition that is objectively superior to that of the competitor, but the customers choose the competitor, usually because of the inability to signal the high quality of the startup's offer. This situation is frequently observed when the competitor enjoys a loyal customer base, or when the company's efforts to give customer information about its proposal are ineffective, being presented in the wrong way. For NTBFs, this is usually the problem in communications: the subjective customers' value (in their view) does not correspond to the objective value offered by the firm. This problem is particularly salient for the 'experience' products/services (such as healthcare), when their characteristics (quality dimensions and price) are hard to observe in advance; instead, they can be properly evaluated only after consumption. Even worse is the situation with the 'post-experience' goods/services (such as vitamin supplements), which cannot be properly evaluated by consumers even after consumption. For experience and post-experience goods, the producer's reputation becomes a

disproportionally important aspect of the business model (Ma & Osiyevskyy, 2017), creating the inertia preventing the consumers from trying the alternative, objectively superior offerings from startups. In such cases, new ventures' failure to convey their true value (signal high quality) leaves the objectively superior companies behind their inferior peers with better communication strategies or more established reputations.

An illustrative case of a new technology-based firm struggling to convey the objectively superior value proposition to its potential customers is the 11-year struggle of Be Inc. Founded in 1990 by Jean-Louis Gassée, a former Apple executive, and supported by the capital of the legendary computer scientist and entrepreneur Seymour Cray, the company intended to develop a revolutionary new operating system to be used by majority of personal computer users, outcompeting dominant at that time Classic Mac OS and Microsoft Windows. In 1991, the first release of BeOS became available, and the system achieved the initial aspirations of being technically superior to alternatives. It could reasonably appeal to the mass market, being optimized for digital media through taking advantage of top features of that time's computer hardware facilities (symmetric multiprocessing, multithreading, preemptive multitasking, and a 64-bit journaling file system able to handle file sizes up to 1 TB—all not available for the users of dominant alternatives at that time). The operating system's graphic user interphase (GUI) was based on the principles of clarity and uncluttered design, superior to that of Classic Mac OS or Windows. Although initial run on proprietary hardware (BeBox personal computer), BeOS was later adapted to run on Apple Computer's Power Macs, and then on Intel x86 architecture, by this means becoming a direct competitor to the two dominant personal computer operating systems at that time. The evidence for the technical superiority of BeOS is that around 1994 Gil Amelio (at that time CEO of Apple) made three offers to purchase Be Inc. to use BeOS on Mac computers. Also, when in 1996 Apple was selecting a new operating system to replace the Classic Mac OS, BeOS was a forerunner along with NeXTSTEP, but because of the influence of the latter's owner (Steve Jobs), BeOS lost that particular competition.

In the late 1990s Be Inc. was able to create and sustain a niche of enthusiastic followers. Yet, the reputation and customer loyalty of Microsoft and Apple, coupled with the customers' perceived switching costs (actually quite low because of the ability to run Mac OS and Windows software on BeOS, but subjectively perceived as high) ultimately prevented BeOS from securing a significant share in the operating systems market. As a result, the company never achieved commercial viability, and was sold in 2011 to Palm, Inc. for $11 million, a fraction of the company's evaluation at the peak of its development.

To avoid Be Inc.'s mistake, new technology-based companies must make conveying the high objective customer value their strategic priority, at the heart of the firm's marketing efforts. In other words, the superiority of the firm's value proposition has to emerge clearly in the customers' minds. Moreover, considering limited marketing budgets (Giver business models do not generate sufficient cash flow on their own), the question of properly targeting the customer acquisition efforts becomes crucial: i.e., the company must invest in acquiring only the targeted, high profit potential customers.

To illustrate a success story of conveying the objectively high value proposition of an 'experience' service, let us discuss the case of TaKaDu (based in Israel)—a leading software provider of Integrated Event Management solutions for the water sector, empowering utilities to manage their networks efficiently. Based on big data analytics, TaKaDu's cloud-based solution enables water utilities to analyze and manage the full life-cycle of network events, such as leaks, bursts, water pressure issues, water quality, and faulty assets. Using raw data from multiple sources, TaKaDu helps utilities detect problems (events) early, reduce water loss, shorten repair cycles, and improve customer service. The technology offers in-depth visibility and quick insights into every type of event, facilitating smarter decisions.

The company was founded in 2009 by Amir Peleg, an entrepreneur with a passion for data analytics. The team worked on the software but needed data to create and test its algorithms. With the help of friends and colleagues, Peleg connected with several water utilities. Some of them were dismissive of the software's efficacy, but others were intrigued and open-minded, so Peleg managed to obtain historical data on water flow, pressure, and other data points.

While the team was working with data and gathering new information from cooperation with water companies, Peleg was demonstrating the progress of the firm via presentations of progress carried out every few months. The main task of the CEO was to ensure that TaKaDu's potential clients saw the benefits of working with the company. The team spent a lot of time with water companies, together doing important cases for them and showing how they care about their customer's success. Thus, TaKaDu was able to convince these utilities of the potential value of its approach—a critical step in the firm's business model. Once operational, the solution was piloted by two utilities on real-time data.

Now TaKaDu's patented solution is deployed in leading utilities worldwide, including Australia, South America, the Middle East, and Europe. Its innovative approach has earned notable commendations, for example the World Economic Forum Tech-Pioneer Award and a Harvard Business School case study.

5.2 Problem 2: Delivery Failure

This typical situation embraces a broad scope of contexts when a startup fails to fulfill promises given to its key customers and, if so, to its investors. This can be related to financial promises, implementation of tasks in promised time, sales promises, etc.

This issue can be illustrated by Tesla Motors, creating a business model where it produces electric cars and provides all the services associated with them. While many car manufacturers have already delegated maintenance services to other companies, Tesla Motors wants to play a major role in every stage of the product life cycle, such as acting as a constant fuel supplier. However, it is impossible to provide such services all over the world at once. To fully satisfy the consumer, it is necessary not only to build a network of charging stations but also make them at

comfortable locations for all. Two hundred and fifty nine charging stations in the US translates into about five stations for one state, so many customers must travel to other cities to recharge the car. Thus, the present-day company's resources do not allow the company to fulfill the promise, which in turn leads to loss of profits.

When that happens, the management must first analyze the reasons for delivery failure. What promises did the company fail to deliver? What is the size of failure? What are the factors that affected it? What actions are needed to prevent failure in the future? How can the situation be changed as quickly as possible? Which resources are needed to achieve a positive result? Lastly, what can be learned from the mistakes, to avoid them in the future?

The recommendation for NTBFs is simple: Every promise that a company makes must be reconciled from the position of the firm's capabilities, the market situation, and the demands of customers and stakeholders. To fulfill the promises, the founding team must make sure that they have everything needed (resources, permissions, confirmation of usefulness, etc.) at market entry. Moreover, they should not be afraid to admit failure when it emerges, as this allows redirecting the venture's potential for a useful purpose.

Another crucial factor of successful value delivery is employee engagement and inspiration. Employee engagement results in a substantive increase in productivity at the level of an individual and a high-performing team, while employee inspiration creates a positive externality when "engagement goes viral" and high-performing members through their passion and successful actions inspire others to engage and increase their productivity (Mankins & Garton, 2017), which all results in dramatic improvement of the quality of actual value delivery.

Employee engagement and inspiration to achieve value delivery hinges upon the proper balance of employee autonomy and responsibility (Mankins & Garton, 2017). In technological companies, delivery failure usually happens because of the wrong decision-making hierarchy, when the employees responsible for delivering the customer value do not have the necessary authority to do so (e.g., the decision-making hierarchy is too centralized and slow). For example, a major manufacturing company in Eastern Europe promised its clients a major freedom with customizing the orders, yet was not giving its own regional field officers the necessary decision-making authority to fulfill this promise. To deal with this problem, the crucial thing is fixing the organizational design to empower the employees to deliver on customer value promises, by eliminating the shortage in authority and span of control. Obviously, the authority has to be matched with responsibility for delivering the results, in terms of ensuring the creation of business value.

5.3 Problem 3: Monetization Failure

This generic situation implies the context when a technology firm offers a great value proposition for customers but suffers losses or has no income (small income) because of the inability to monetize it. To illustrate the case, consider the case of

Viber, a popular voice over Internet protocol (VOIP) application that is used by 360 million users in 193 countries worldwide. One of the reasons behind Viber's popularity lies in its mandate to never charge for its software, never display any ads, and never charge for Viber-to-Viber calls or text messages.

Is Viber Profitable? The short answer to this question is "no." Although having been around for nearly 5 years and boasting 249 million monthly average users, Viber still has yet to make a dime. In 2013, the company was acquired by the Japanese Internet giant, Rakuten, for $900 million as part of their global Internet services takeover strategy (Rakuten holds notable stakes in other social media services such as Pinterest and the failed Kindle-esque app, Kobo). On the day the sale was announced, Rakuten's shares plummeted by 9.5%, the most in 4 years, as shareholders assumed this was just another folly in a series of blunders committed by a management whose lavish spending was depleting the company's financial resources.

This bearish sentiment was not without support, as official documents from Rakuten showed that Viber made a total of $1.5 million dollars in revenue and incurred net losses of $29.5 million in 2013 and $14.7 million in 2012. While Viber's strict adherence to keeping the app free of advertisements and free to download is laudable, it is quite obvious that its current monetization model is woefully inadequate and requires a revamp, if Rakuten is to justify its $3.61 per-user investment. For now, based on official promo materials, Viber's website, and third-party sources, we can infer that Viber makes its money through the following channels: Viber Out, Viber Stickers, Viber games, and potentially from a 2013 soft launch of international call "termination" services (the current status of which is unknown). As of today, Viber has yet to make a profit.

Consider this against Facebook's case. When the company filed for an IPO in February 2012, expectations were extremely high. The social network had amassed 845 million users in 2011 and its revenue was growing to nearly $4 billion. Priced at $38 a share, Facebook was predicted to raise $16 billion, making it the largest technology IPO in U.S. history. Yet Facebook's key monetization mechanism—its advertising business—also came under fire. Days before Facebook's public debut, General Motors, the third largest online advertiser in the U.S., stopped its paid advertising on the social network. Executives at GM claimed advertising on Facebook had little impact on their consumers' car purchase decisions and did not feel the $10 million they spent the year prior was worth the investment. As the IPO loomed, some investors expressed concern that Facebook's advertising growth wouldn't keep pace with the growth of mobile users.

On May 18 2012, Facebook's public trading did not go as well as planned. Right from the outset, technical glitches with the Nasdaq exchange delayed orders almost 30 min. Then after jumping 13%, Facebook's stock struggled to stay above the IPO price, closing at only $0.23 above its original value. The opening day performance was largely considered a disappointment. Facebook shares continued to drop over the next few months, tumbling to as low as $17.73 in September.

Yet, Facebook was able to persuade its investors in the new opportunities for the company to leverage its wealth of data, connections to mobile apps developers, and

improved search capabilities. As a result, Facebook's stock had recovered and rose to $61 per share by the end of January 2014.

On a strategic level, the monetization failure is caused by the inability to appropriate the rents: the margins go to resource providers (Porter's supplier bargaining power threat) or buyers, who enjoy economically unjustified low prices. The root cause of such a state is the absence of *real* competitive advantage, i.e., the differentiation in value creation that would secure sufficient market power.

Yet, competitive advantage is not enough to successfully monetize a business model; in addition, the startup has to develop a viable profit formula (assets and fixed cost structure, and the necessary margins and velocity: Christensen, Bartman, & Van Bever, 2016). Finally, once a Winner business model is established, companies can still fall back into the Giver state because of the failure to understand and manage the growth drivers (Treacy & Sims, 2004).

Hence, NTBFs have to nurture their real competitive advantage through going back to the basics of a successful strategy: (i) proper selection of the target market (to gain a temporary monopoly), (ii) developing and sustaining valuable, rare, inimitable, and non-substitutable resources (Barney, 1991), and constantly innovating (Teece, 2007). This competitive advantage becomes the basis for creating the business value through profit—real or potential. In addition, the secured competitive advantage must be leveraged by developing and implementing a viable profit formula within the business model and instituting the mechanisms for managing future growth.

5.4 *Problem 4: Failing to Scale Up the Successfully Validated Business Model*

The symptom of this challenge is the following: the business model of the technological venture is successful, but when attempting to expand the business (new store, market or country) using the business model successfully validated on a small scale, it loses its effectiveness and/or efficiency. Not all business models are inherently scalable, and the main task of the firm in that situation is to understand how to transfer a validated business into the new contexts.

Quirky manifested this problem. Launched in 2009 by Ben Kaufman, the start-up pledged to help regular people turn their ideas into real products and sell them in stores nationwide. Initially, the company looked like it would be a big success. The founder grew his company to 300 employees and raised $185 million in venture capital. Quirky created hit products, such as a power cord that could pivot or a stem that lets customers have fresh aerosoled juice to spritz up the food avoiding cutting process, and a few members of its inventor community earned hundreds of thousands of dollars in royalties (see Table 1).

Yet, the successful business model did not scale. At the end of 2014, the New York City start-up had laid off more than 20% of its staff, burned through

Table 1 Quirky's successful products

Product	Units sold	Inventor earnings
Aros—smart air conditioner. It can be controlled from your smartphone and learns your habits, knowing when you typically leave and return to your home	1762	$360,903
Cordies—a paperweight for cables that keeps them in a consistent location and helps to cut down on desktop clutter	521,750	$360,367
Stem—lets you avoid cutting or juicing the fruit of your choice. Just stick the nozzle into the fruit and spray and you'll quickly have fresh aerosoled juice to spritz up whatever food you'd like	157,829	$45,195
Verseur—a four-in-one tool that includes a wine opener, foil cutter, pour spout, and stopper	54,888	$40,618
Earbuds all too often end up a tangled mess when you keep them in your pocket. **Wrapster** prevents this technological spaghetti and makes daily life just a little bit easier	537,064	$175,085

tens of millions of dollars, and discovered that its founding business model broke at growth. Many of Quirky's products had thin to non-existent margins. For example, the company spent nearly $400,000 on developing a Bluetooth speaker that only sold 28 units. Its Wink unit also faced distress, and a botched security update meant the company had to do a nationwide recall the spring of the same year of all of its smart home hubs.

The startup ran out of money and filed for bankruptcy in 2015. It had struggled to change its business model after several rounds of layoffs, and eventually sold its Wink smart-home business for $15 million. On July 31, 2015, Ben Kaufman stepped down as CEO following a layoff of 111 employees due to trouble getting funding.

An opposite case of success in scaling up a business model comes from two of today's giants, Uber (a ride-sharing service operating in 633 cities worldwide as of August 2017) and Airbnb (an online marketplace for short-term lodging covering 65,000 cities worldwide). Both companies started as typical new technology-based firms in 2008, and were able to successfully grow to multibillion enterprises through a combination of scalable ("asset-light") business models coupled with access to sufficient venture capital funding allowing them to leverage their scalability.

From this, the key recommendation for technology ventures is obvious: the founders must make sure that their business model is flexible, self-sufficient, and free of major constraints before expanding the business. Scaling up can be achieved by: (1) moving to products/services with low variable costs (or low share of Cost of Goods Sold in revenue), instead of leveraging the fixed costs; (2) standardization of operations, products, services; (3) franchising strategy; and (4) engaging in low-cost marketing.

5.5 Problem 5: Low Relevance of the Customer Value Offered

This challenge of technology ventures happens when the founding team is focused on services it already offers, ignoring or neglecting the changing requirements of customers or emergence of new technologies entering that may affect the market. This results in an inability to actually solve customer problems (satisfy their needs) in the best way possible for the price asked, leading to the loss of dynamic consistency between the business model and the market environment coupled with the loss of market share to new competitors who meet consumers demands better. At the core of this issue lies the loss of the attractiveness of the company's value to its key customers; i.e., the company fails to offer a solution to one or more of the customers' key pressing problems that would be effective when assessed against the price asked and against the competitors' offerings.

The rise and demise of Cuil (active July 2008 till September 2010), a search engine aiming to directly compete with Google, illustrates the perils of failing to solve customer problems in the best possible way. Founded by former Google employees and having raised $33 million from top venture capital firms in Silicon Valley, Cuil claimed to have an index larger than that of any other search engine, not to store users' search activity or IP addresses, and to display relatively long entries and thumbnails in the results. Alas, as these features came at a cost of slower response times, and frequently wrong or irrelevant search results (including at least one recorded case of inappropriately showing pornographic images in thumbnails). Yet, in the modern world of information abundance, results' relevance trumps index size. As a result, Cuil's distinct value proposition turned out to be irrelevant (or at least inferior to that of Google) for most customers, and on the morning of September 17, 2010 the aspiring search engine shut down the service and laid off all employees without compensation.

Hublot's success case, on the other hand, demonstrates that failure is not inevitable. In 2004, Jean-Claude Biver took the helm of Hublot, a watchmaker founded in the 1980s. At the time, Hublot had made a splash by offering a watch whose case combined gold and natural rubber. But by the early 2000s sales had begun to wane. To give the House a fresh boost, Jean-Claude Biver capitalized on the original idea to invent a fusion concept for watchmaking, proposing a new take on high-end chronographs that spotlights functionality and the performance of the case, along with the materials of which they are made. This was a bold gamble in an industry deeply attached to traditions and the methods of time-honored craftsmanship. The concept became the cornerstone behind Hublot's renaissance.

The key cause for the failure in this context is usually related to primarily information acquisition and processing problems (bounded rationality of managers: relevant customers' information is not reaching the strategic decision makers). Root causes are (a) problems in the accounting system (external, customers' views not getting enough attention), and (b) top management team's cognitive "blinders" (inability to properly assess and act upon the objective situation). To ensure the movement in the right direction, the firm must constantly analyze the market and

remain close to actual customer demand. Even if the firm's current business model is successful, there will always be changes that cannot be resisted.

5.6 Problem 6: Inability to Focus on the Key Customers

In its essence, a business model is intended to serve the stakeholders of the firm—its consumers, investors, and partners up and down the value chain (e.g., the suppliers and distributors). Yet, the management must choose the key (primary) customer—the market stakeholder that the firm is primarily designed to serve—and focus all its efforts on optimizing the value provided to this stakeholder: "Organizations can be designed effectively to serve only one master" (Simons, 2005). After the primary customer has been defined, the next step is to configure resources into a coherent structure to serve that stakeholder and to ensure that the firm delivers superior value to it. While the requirements of all essential stakeholders must be satisfied on the minimally appropriate level (to ensure their support), the value created for the key customer must be maximized. When there is no focus in a company, it may be confused about its purpose and whom it is designed to serve. If everyone is a customer, then no one is. Hence, successful business models should be aimed at a specific customer.

The case of Facebook and MySpace in 2007 illustrates this point. By the end of 2007, it had become clear that MySpace—then the largest online social network—had to start responding to Facebook, or risk losing its leadership position. Whereas MySpace always considered end-users its key customers, and hence concentrated on attracting and retaining them, Facebook selected a different strategy, that of concentrating on partners that would attract the end-users. The company launched the Facebook Platform in May 2007, allowing developers to build programs that could be integrated within the Facebook site and, even more, to keep any revenue that their application generated. By January 2008, over 13,000 applications had been released and an estimated 100,000 developers were building Facebook applications. Applications and games built on that platform had attracted over 40% of Facebook users by 2011. For example, the iLike site, which had about 3.5 million users, added five million new users within 60 days of its Facebook launch and reached more than 11 million people by the end of 2007. Satisfaction of needs of Facebook Platform's key customers—developers—helped to do the same for other users. MySpace had to do something quickly, but the fateful decision was delayed, ultimately costing MySpace its leadership.

In summary, the management of technology ventures must properly identify the key customer at a particular stage of the company's development: this can be partners in the value chain, end users, buyers (who are paying for end users: consider health insurance companies dictating the medical decisions), or key suppliers. Moreover, as the case of Facebook demonstrates, the key customer of a business changes with time, and this change must be handled timely and properly. The identification of key users can be done by frankly answering the following questions:

(a) What benefit do we bring? (b) Who appreciates it most? What are they giving to us? (c) Is there somebody who will give us more opportunities? What are their demands? Can we reach it through our current customer focus? If not, how can we do this?

6 Discussion

In the current chapter, we intended to address the following questions: (1) What is a firm's business model, and how is it related and distinct from strategy, technology, and innovation? (2) What is the role of the business model in the process of development of new technology-based firms? (3) What are the most frequently occurring problems with new ventures' business models that prevent their development? Drawing from the strategy and entrepreneurship literature, we demonstrate that in the process of development of NTBFs, the crucial role belongs to establishing an effective and efficient business model to deploy the focal technology in a sustainable way. By this means, we demonstrated that the business model design and testing/validation become the essential parts of a startup process. From definitional issues, we proceeded to discussing the role of business models in the process of development of NTBFs. Then, we summarized the available empirical material to formulate the most frequently occurring problems with new ventures' business models that prevent their development, paying particular attention to ways of preventing and dealing with such problems. The developed conceptual framework of business model-related NTBF challenges was illustrated and corroborated with the mini-cases of technology ventures.

During their development from the concept to operational venture stage, most NTBFs need to overcome the "Giver Trap," when the objectively high business model effectiveness (customer value) gets translated into high efficiency (business value). This Giver→Winner move requires a major improvement of the efficiency of a business model, along two tightly coupled paths: (a) delivery—quality of fulfilling the promise of the value proposition to the primary customer; and (b) monetization—ability to charge customers a fair price, resulting in ultimate profit from the business model. In addition to specific recommendations discussed with each of the four problems related to this transition (problems 1–4 above), in this section we emphasize one general recommendation for venture management: within NTBFs, it is essential to institutionalize processes for continuous monitoring of the unexpected failures and—more importantly—unexpected successes revealed during the business model execution. This will allow detecting the problems early on, while capitalizing on unexpected emerging market opportunities (Biloshapka, 2014).

Once a technology venture finds a way to monetize the business model, establishes sustained revenue streams, motivates new and current customers to switch from competitors and substitutions, and takes control of expenses, the company moves into the Winner quadrant. Yet, at this stage the success cannot be taken for granted: staying a Winner requires strategic decisions and relentless actions. Without

deliberate efforts to extend the Winner period, with time, the customer value erodes, while the business value lasts as long as the firm can retain loyal customers, good reputation, and brand equity—the typical Taker situation. Then, predictably, with time, the customers switch to better alternatives and the company finds itself in the Loser situation. The key challenge of companies with the Winner business models is in sustaining this position. Although successful and prominent in the past, any company will be dethroned one day, unless it ruthlessly pursuits proactive growth strategies and shields from the fatal impact of the competency trap ('core rigidities' caused by cognitive inertia of the managers of a successful company). These proactive strategies include explicit acknowledging and acting upon the notion that the real success implies not only above-the-average returns and a top market position, but also understanding the true causes of this success. Embracing this paradigm leads to continuous evaluation and re-evaluation of the objective customer value created by the company's business model, and constantly keeping track of the efficiency of translation of customer value into business value.

Regardless of the current stage of the technology venture's current business model, there are general recommendations concerning moving to a Winner's business position and then sustaining it in the future. The basis of these recommendations is a high-performance organizational culture (Biloshapka, 2014). In today's turbulent environment, the venture's management must create and relentlessly sustain an externally-focused culture at the intersection of market and innovative domains (Cameron & Quinn, 2005). The key competency in this culture becomes alertness to external opportunities and ability to properly act on them.

At the same time, the culture within a technology venture must explicitly require all employees to take unambiguous responsibility for the elements of the business model. In other words, the organizational culture must require each key employee (up to CEO) to clearly formulate their commitments aligned with the organization's desired business model (creating customer and/or business value) and—most importantly—translate these commitments into actionable and viable individual plans. This culture must also fuel the efficient strategic dialogue within the company, ensuring that the way to the winner's business model is not only accepted, but also fully understood by every employee of the company—in terms of their own small or big steps towards it. Such strategic dialogue hinges upon a set of leadership competencies of the high-performance culture: setting the right agenda and expectations regarding the operation of the business model, making and gaining valuable commitments from subordinates, providing timely corrective feedback (Biloshapka, 2014). Our empirical evidence from numerous NTBFs struggling to reach the winner's business model suggests that it is the lack of such competencies that has to be addressed first. It becomes vital to secure the development of those competencies if the management is serious about preventing strategy and business model communication problems.

The next recommendation deals with an issue so obvious that it tends to be ignored by executives—the smart budgeting system, ensuring that investments in cost centers (R&D, marketing, business development) are closely tied to the commitments of internal customers of those centers to developing the winner's business

model and further sustaining it through relentlessly exploiting the revenue growth drivers.

Finally, the numerous examples of stakeholder backlash against thriving new technological companies (such as cab drivers fighting Uber, renters associations and hotel chains fighting Airbnb) suggest the crucial importance of incorporating the "Shapeholders" thinking into the business models of NBTF from the outset (Kennedy, 2017; Osiyevskyy & Biloshapka, 2017). The term "shapeholders" refers to those persons or organizations that have no stake in a company but have a powerful ability to shape its future: e.g., social activists, media, politicians, and regulators. Because they don't share in a company's losses or gains, shapeholders have significant freedom to challenge or block the firms' activities, or impose actions or practices without clear micro-economic benefit for the firm (Verbeke, Osiyevskyy, & Backman, 2017), unlike "traditional" stakeholders (customers, employees, value chain partners) whose interests are at least partially aligned with the interests of the firm. However, shapeholders should not be treated solely as malevolent players that can only hurt the business. Shapeholders' concerns are usually well-grounded and legitimate; also, they can create enormous opportunities for smart new ventures capable of effectively engaging with them through proper configuration of their business models. Indeed, "Granting preeminence to market-focused shareholders with short-term planning horizons effectively diminishes the power of important stakeholders (such as innovative employees and partners) and shapeholders (e.g., clean energy carrot activists), whose commitment is essential to the long-term survival of the company. In a nutshell, managing shapeholders is a part of the messy democratic process that works when power is apportioned fairly, and this process underpins the winning business models of true market leaders" (Osiyevskyy & Biloshapka, 2017).

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