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DOES BUSINESS MODEL MATTER FOR STARTUP SUCCESS? A QUANTITATIVE ANALYSIS

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Research in Progress

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Abstract

In multiple research areas, scholars try to find determinants for business performance. Especially for entrepreneurship, this is of interest as failure rates are high. Qualitative research demonstrates that a firm's business model influences its performance. However, research lacks large-scale quantitative studies to analyze if a firm's applied business model explains heterogeneity in business performance. Therefore, this research builds on a dataset of 500 startups and analyzes the relationship of their applied business model patterns and their business performance (i.e., survival as proxy). Two business model patterns are significantly correlated with a higher survival rate (i.e., Freemium and Subscription), while four patterns are significantly correlated with a lower survival rate (i.e., Cross Selling, Hidden Revenue, Layer Player, and No Frills). For literature, we enrich qualitative research with statistical evidence that business models matter for business performance and strengthen the concept's role as a useful theoretical construct in management and entrepreneurship research. For practice, the paper reinforces the importance of business models for startup success and provides clear guidance regarding which business model pattern increases the probability of startup survival. Findings provide first insights in the relationship of business models and business performance and opens up fruitful areas for future research.

Keywords: Business Model, Startup, Performance, Quantitative Research

1 Introduction

Startup firms are a driver of economic growth, innovation, and employment opportunities (Yankov, 2012). However, the majority of startups fail, with estimates ranging from 50% to 83% and up to 90% (Laitinen, 1992; Wetter and Wennberg, 2009; Krishna, Agrawal, and Choudhary, 2016). Management and entrepreneurship scholars have discussed various explanations. Krishna et al. (Krishna et al., 2016) explain firm performance mostly with financial factors, such as the amount of funding received. Cressy (2006) identifies trading losses, bad luck, and entrepreneurial talent as decisive factors for success. Strotmann (2007) detects talent, *"entry-mistakes,"* and industry-specific conditions as aspects that affect the success of startups. Nevertheless, the question on why some startups fail while others succeed remains as one of the central questions across research communities (Cooper, 1993; Spiegel et al., 2015).

In business model research, a discussion on the correlation between business models and enterprise performance has emerged (Zott, Amit and Massa, 2011; Lambert and Davidson, 2013; Foss and Saebi, 2017; Massa, Tucci and Afuah, 2017) and shows that business models are important for competitiveness and can create a new factor of innovation.

However, a large portion of business model research is qualitative in nature and highly contextual (Lambert and Davidson, 2013; Demil, Lecocq, Ricart and Zott, 2015; Spiegel et al., 2015). Many papers use case studies in specific industries, ventures, or regions, what limits their generalizability (Demil et al., 2015; Hermes, Böhm and Krcmar, 2019). Questions about the relationship of the firm's business model and its performance remain unanswered, for theory and for practice. Hence, there is a need for more quantitative research (Lussier and Pfeifer, 2001; Al-Debei and Avison, 2010; Zott et al., 2011), especially with a holistic understanding of business models and an industry-independent focus (Lambert and Davidson, 2013; Foss and Saebi, 2017). In this way, business models can become a comparable influencing factor for business performance (Demil et al., 2015).

Summarizing, neither entrepreneurship research nor business model research provides evidence for a correlation of certain business models and business performance (Al-Debei and Avison, 2010; George and Bock, 2011; Lambert and Davidson, 2013; Spiegel et al., 2015). The business model concept is a commonly used tool in practice. Business model patterns allow measuring this concept and provide direct implications for startups. Therefore, this paper investigates the statistical relationship between a startup's business model patterns and its performance. We address the following research question.

RQ: How important are business model patterns for explaining the heterogeneity in startup success?

This paper presents a statistical analysis about how startup success correlates with the applied business model patterns and identifies business model patterns that correlate with higher or lower success. We derive our hypothesis according to the influence of applied business model patterns on the chances of survival for startups. We test this hypothesis using a dataset of 500 startups, with each startup coded according to the 55 business model patterns defined by Gassmann et al., (Gassmann, Frankenberger and Csik, 2013) We apply contingency analysis and find evidence for our hypothesis. Results reveal two business model patterns significantly correlating with a higher startup survival and four patterns significantly correlating with lower startup survival. Thus, the business model matters for business performance. This underlines its role as a useful theoretical construct in management and entrepreneurship research. For startups, the paper emphasizes the importance of business models for startup success and provides clear guidance concerning which business model pattern might support success.

2 Related Work

In the last two decades, business model research evolved rapidly, resulting in a large body of research aiming to explore and explain the concept of business models and its practical implications (Zott et al., 2011; Foss and Saebi, 2017; Massa et al., 2017). Still, scholars do not agree on one common understanding and definition of a *"business model."* Massa et al. (2017) categorize existing definitions as: *"(1) business models as attributes of real firms having a direct real impact on business operations, (2) business models as cognitive/linguistic schema, and (3) business models as formal conceptual representations/descriptions of how an organization functions."* This paper uses the business model as a formal conceptual representation (Massa et al., 2017). Hence, a business model *"describes the design or architecture of the value creation, delivery, and capture mechanisms"* (Teece, 2010). Business models can be composed of multiple business model patterns (Osterwalder and Pigneur, 2010; Gassmann et al., 2013). Business model patterns are *"business models with similar characteristics, similar arrangements of business model Building Blocks, or similar behaviors"* (Osterwalder and Pigneur, 2010) that have been successful in the past (Gassmann et al., 2013) and are applicable in other contexts (Amshoff, Dülme, Echterfeld and Gausemeier, 2015; Weking, Hein, Böhm and Krcmar, 2018).

That business modes affect firm performance can be derived from the resource-based view (RBV) and the related theory of dynamic capabilities (Teece, 2007). The business model itself can be seen as a unique resource for competitive advantage (Barney, 1991), at least for a period of time since it can eventually be imitated (Teece, 2018). However, it influences and shapes dynamic capabilities, which can ensure sustainable competitive advantage (Teece, 2018). Thus, business models can impact firm performance.

Several studies support this hypothesis. The effects of business models on firm performance has emerged as one research stream (Zott et al., 2011; Osterwalder and Pigneur, 2012; Foss and Saebi, 2017; Massa et al., 2017). The concept of business models is relevant for firm performance (Shafer, Smith and Linder, 2005; Al-Debei and Avison, 2010; Rietveld, 2017). Afuah and Tucci (2001) even claim it is one of three determinants of performance. From a strategy perspective, the business model plays a crucial role in strategic planning in a rapidly changing macro-economy and can increase returns (Massa et al., 2017). Shafer et al. (2005) point out that no guarantees can be given solely by the business model. But, it forces to question strategic options, thereby increasing the chances of long-term success. One aspect is the idea that firms differentiate and, therefore, compete through their business model (Casadesus-Masanell and Ricart, 2010) and not through products or processes (Gassmann et al., 2013). Here the business model itself is a source for competitive advantage (Afuah and Tucci, 2001; Markides and Charitou, 2004). Another root of firm performance is the *"ability to both create and capture value"* (Shafer et al., 2005), which are both covered in the business model concept (Osterwalder, Pigneur, and Tucci, 2005). A firm may be superior in creating value by applying a unique business model (Morris, Schindehutte and Allen, 2005). Chesbrough (2010) claims that the business model is more significant for value creation than the product itself. Thus, great innovations fail if the business model is not designed properly (Teece, 2010). Executive research finds that business model innovation leads to higher profitability than product or process innovation and highly innovative firms do innovate their business models (Boston Consulting Group, 2009). Firms that innovate their business models are more likely to outperform their markets (IBM Corporation, 2012).

Summarizing, most business model research is of a qualitative nature (Lambert and Davidson, 2013; Demil et al., 2015; Spiegel et al., 2015). To make business models comparable with other performance indicators (Demil et al., 2015), quantitative research on business models and firm performance is needed (Lussier and Pfeifer, 2001; Al-Debei and Avison, 2010; Zott et al., 2011; Foss and Saebi, 2017), especially with a holistic, industry-independent focus (Lambert and Davidson, 2013).

Our quantitative analysis of business models as performance indicators takes place in an entrepreneurship context because startups show an enormous failure rate (Laitinen, 1992; Wetter and Wennberg, 2009; Krishna et al., 2016). The influencing factors of startup success or failure remain a central question in research (Cooper, 1993; Spiegel et al., 2015). This research focuses on the mere survival of a startup as the essential metric of startup success.

The survival of a startup is ultimately determined by its ability to cover all its costs. In accordance with other qualitative research on business models, Morris et al. (2005) argue based on Schumpeter (1936) that an effective business model is responsible for superior returns. Further, the returns of the same product vary based on the business model (Chesbrough, 2010). Thus, we argue that some business model patterns enable firms to generate higher turnover or at least generate sufficient turnover faster so that a startup can survive. Thus, we propose our hypothesis as follows.

Hypothesis: *Applied business model patterns influence the chances of survival for startups.*

Existing qualitative research already investigated on the correlation between business model and firm performance. In two papers, Zott and Amit (2007a, 2007b) reveal that some business models, if novelty-centered, outperform others. If the business model is based on increasing efficiency, then it may be influential on firm performance. By finding proof for the interaction with a firm's product market strategy, they show that business models do have an impact on distinct entrepreneurial aspects, thus influencing a firm's market value. Malone et al. (2006) analyze all publicly traded US firms between 1998 and 2002 and find that some business models perform better than others. Kraus et al. (2017) at-

test this relation for *"born-global"* startups, using quantitative surveys and qualitative interviews with 252 founders. Spiegel et al. (2015) conclude that socially well-connected founders are more successful because their networks help them develop the right business model. In contrast, Camison and Villar-López (2010) find *"no significant differences in performance between the different business models."* Some scholars used a cluster analysis or very general business models before investigating the dependent success variable (Malone et al., 2006; Böhm et al., 2017) while others focused on specific aspects of the business model (Zott and Amit, 2007a, 2007b; Spiegel et al., 2015) or on very specific firms (Camison and Villar-López, 2010; Kraus et al., 2017). Even though these studies already improve the understanding of performance implications caused by the applied business model, none uses a holistic understanding of business models, such as business model patterns, and provides a large-scale analysis. This paper provides the first large-scale empirical research based on startups and business model patterns. Our research is a general analysis that provides insights on specific business model patterns, targeting the question if any explicit business model patterns result in higher or lower chances of startup success.

3 Dataset and Research Method

The dataset contains 500 startups from Crunchbase (www.crunchbase.com). All firms were founded in 2015 and were randomly selected so that 250 of the firms were still operating and 250 had failed. This sampling reduces the success bias of the self-reported database (Antretter, Blohm and Grichnik, 2018). For each startup, we coded 55 binary variables that describe whether a startup applies a business model pattern (1) or not (0). This results in a vector as illustrated in Table 1.

BMP	1	2	3	4	5	…	50	51	52	53	54	55
Appl.	1	1	0	0	0	…	1	0	0	1	1	0

Table 1. Example vector of a startup's applied business model patterns

Two persons coded the applied business model patterns and consolidated their results in regular meetings to ensure intercoder reliability. As an objective proxy for startup success, we use the binary variable operating (1 = still operating and 0 = failed). We scanned the firms' webpages in addition to the Crunchbase website for data triangulation. The dataset was created by the end of 2017. Thus, we can evaluate startups and their business model after two years of operation and avoid coding initial business models that startups do not follow anymore.

To test the hypothesis (whether the applied business model pattern has an impact on the survival of a startup), we chose the contingency analysis, which provides a way to discover correlations between two nominally scaled variables (Backhaus, Erichson, Plinke, and Weiber, 2015). The scale level of the independent variable (the applied business model pattern) is nominal and the dependent variable for the hypothesis (survival of the firm) is on a nominal scale as well. We used the programming language R and the IDE RStudio. For each pattern, we created a contingency table with the application variable and the success variable as illustrated in Table 2. These tables were analyzed as to whether a correlation exists.

	Success	
Two-Sided Market	**0**	**1**
0	166	194
1	83	55

Table 2. Example of a Contingency Table (Pattern: Two-Sided Market)

If an expected frequency in a contingency table was below five, we did not include the business model pattern in our further analysis as suggested for chi-squared tests (Backhaus et al., 2015). Based on the percentage of success or failure if a business model pattern was applied, we drew an interpretation whether a correlation may exist. We assumed no correlation if the difference between success and failure was below 20%. Next, we performed a chi-squared test to determine the randomness of the correlations and their respective strength. The randomness could be disproved if the *p*-value was below 0.05 (Backhaus et al., 2015). As Backhaus et al. (2015) suggest to perform the exact Fisher test for samples with $n < 20$, we used this test to reassure the results of the chi-squared test. Finally, the phi-coefficient (φ) was calculated to investigate the strength of the correlations.

4 Results

Business Model Pattern	***n***	**Fisher *p*-Value**	**Chi² *p*-Value**	**Phi-Coefficient (φ)**
Addon^{+}	492	0.08740	0.140100	−0.08
Cross Selling* **	500	0.00043	0.000956	−0.16
Crowd-Sourcing*	498	0.01705	0.020270	−0.11
Customer Loyalty**	495	0.00717	0.021440	−0.12
Freemium*	419	0.01208	0.018610	0.12
Hidden Revenue**	427	0.00219	0.002843	−0.15
Ingredient Branding*	496	0.00345	0.011800	−0.13
Layer Player**	492	0.00119	0.001620	−0.15
Leverage Customer Data**	486	0.00356	0.004850	−0.14
Long Tail*	498	0.02026	0.025340	−0.11
No Frills* **	497	0.00028	0.000603	−0.16
Rent Instead of Buy^{+}	498	0.05349	0.088950	−0.09
Subscription* **	450	0.00001	0.000029	0.27
Two-Sided Market**	498	0.00675	0.006866	−0.13
Ultimate Luxury^{+}	499	0.09029	0.136500	−0.08

$^{+}P < 0.10$; $*P < 0.05$; $**P < 0.01$; $***P < 0.001$

Table 3. Results of the Contingency Analysis

Table 3 shows the results of our analysis. The table includes the business model patterns that passed all prior sorting only, thus all are significant. The phi-coefficient indicated toward firm success for the business model patterns *Freemium* and *Subscription*. The pattern *Subscription* shows with $\varphi = 0.27$ by far the strongest correlation in our results. For the *Freemium* pattern φ is 0.12, which is statistically not indicating a non-trivial strength of the correlation (Backhaus et al., 2015). Still it shows an indication towards an increased survival rate. We further include four business model patterns in our discussion that indicate a worse survival rate. We focus on patters with the strongest effect size (i.e., $\varphi \leq -0.15$): *Cross Selling*, *Hidden Revenue*, *Layer Player* and *No Frills*. Table 4 summarizes the results and defines the relevant business model patterns.

Business Model Pattern	Definition (Gassmann et al., 2013)	Survival Rate
Subscription	The customer pays a regular fee, typically on a monthly or an annual basis, in order to gain access to a product or service.	increase
Freemium	The basic version of an offering is given away for free in the hope of eventually persuading the customers to pay for the premium version.	increase
Cross Selling	Services or products from a formerly excluded industry are added to the offerings, thus leveraging existing key skills and resources.	decrease
Hidden Revenue	The main source of revenue comes from a third party, which cross-finances whatever free or low-priced offering attracts the users.	decrease
Layer Player	A layer player is a specialized company limited to the provision of one value-adding step for different value chains.	decrease
No Frills	Value creation focuses on what is necessary to deliver the core value proposition of a product or service, typically as basic as possible.	decrease

Table 4. Definitions of Business Model Patterns

5 Discussion

Why many startups fail (50–90 %) while others succeed and grow exponentially remains an important topic for research and practice (Cooper, 1993; Spiegel et al., 2015). Business model research shows that a firm's business model influences its performance (Zott et al., 2011; Lambert and Davidson, 2013; Foss and Saebi, 2017; Massa et al., 2017). However, research lacks large-scale quantitative studies to demonstrate if applied business models explain heterogeneity in business performance. In this paper, we analyze a dataset of 500 startups according to the relationship of their applied business model patterns (Gassmann et al., 2013) and their business performance (i.e., survival as proxy).

The contingency analysis revealed a significant correlation between the applied business model pattern and startup survival for 15 out of 55 business model patterns. We discuss six patterns in the following and focus on the ones with the strongest effect size. Two of these 15 business model patterns point toward higher chances of survival, namely, *Freemium* and *Subscription* ($\varphi \geq 0.12$). The *Freemium* pattern leads to higher chances of survival. Related works, such as Liu, Au, and Choi (2014) analyzed *Freemium* apps in the Google Play Store. Paid mobile apps showed increased sales volume if there is an additional free version of the app. Similarly, Bawa and Shoemaker (2004) showed that free samples create increased sales for the paid product. Both studies indicate higher sales measures for tangible products as well as mobile apps with a *Freemium* business model. This paper underlines these results by revealing that *Freemium* also contributes to the survival of startups. As the critical point for young firms is to be recognized by customers, sell their first product(s), and become established in the market, without sales or positive growth rate, they will struggle to receive needed funding or even to reach break-even (Böhm et al., 2019). Second, the *Subscription* pattern additionally indicates higher survival rates. In the software industry, *"the subscription model helps the vendor lock in consumers so as to increase profit when there is great uncertainty associated with the next version software"* (Zhang and Seidmann, 2010). Because startups typically deal with uncertainty in various domains, including the development of their product or service, this effect may be applicable in this context. Moreover, the subscription model aims at continuous revenue streams. This additionally supports survival and a stable base for further growth. In this paper, we underline these findings and see that subscription as well contributes to higher survival rates of startups.

In contrast, the analysis showed a higher failure rate for startups applying the patterns *Cross Selling*, *Hidden Revenue*, *Layer Player*, and *No Frills* ($\varphi \leq -0.15$). First, *Cross Selling* leverages an existing customer base and therefore is difficult to apply in early stages of firms. This might lead to lower chances of survival when applied. Second, *Hidden Revenue* typically builds on advertising as revenue stream (Gassmann et al., 2013). However, advertising as revenue stream has various disadvantages

(Clemons, 2009) and is difficult to establish in early stages without strong customer base. This might explain the negative influence on survival rates. Third, for applying *Layer Player* a startup would need access to different value-chains and specialize on one value adding step. This problem of access might lead to lower survival rates. Additionally, a few big players often dominate these single steps, such as PayPal. Fourth, with *No Frills* firm follow a low-price strategy and gain revenues with selling additional services. However, this requires financial resources to enable selling with a negative ratio, what is problematic for startups and explains the pattern's negative impact on survival.

5.1 Contributions to Research

This study contributes to two literature streams. First, the results contribute to strategy and business model literature. We support the understanding of business models as unique resources (Barney, 1991; Teece, 2018). The findings add quantitative support to the current qualitative research on implications of business models on performance (Shafer et al., 2005; Al-Debei and Avison, 2010; Rietveld, 2017); Afuah and Tucci, 2001). This research provides evidence that a startup's chances of survival are associated with its business model. It shows that some business models perform better than others do. We find quantitative and empirical support for the theory that firms differentiate and compete through their business model (Casadesus-Masanell and Ricart, 2010) and not only through products or processes (Gassmann et al., 2013). A firm's business model can support competitive advantage (Afuah and Tucci, 2001; Markides and Charitou, 2004). *Freemium* and *Subscription* ensure startup survival. The results address several calls for research in the business model literature. We provide quantitative research on business model success (Lussier and Pfeifer, 2001; Al-Debei and Avison, 2010; Zott et al., 2011; Foss and Saebi, 2017). The results especially show a holistic, industry-independent focus on the relationship between business model and firm performance (Lambert and Davidson, 2013). Moreover, results extend quantitative business model research, e.g., Zott and Amit (2007a, 2007b) and Malone et al. (2006), by identifying two explicit business model patterns that demonstrate higher chances for startup survival and four patterns that indicate lower chances for startup survival. Overall, the findings demonstrate that the business model influences business performance. This contributes to our understanding of the impact of business models and underlines that the business model is a useful theoretical construct in management research (Massa et al., 2017).

Second, the results advance entrepreneurship research by providing new insights on how to explain heterogeneity in startup survival. The paper shows that a startup's applied business model can partly explain its survival. The results reveal that the business model is relevant and a new influencing variable for startup performance. In addition, findings show certain business model patterns that are more likely to result in a startup's survival (i.e., *Freemium* and *Subscription*) and failure of a startup (i.e., *Cross Selling*, *Hidden Revenue*, *Layer Player*, and *No Frills*). Overall, the findings contribute to explaining startup performance and, thus, advance entrepreneurship literature.

To the best of our knowledge, we conduct the first large-scale empirical research based on business model patterns and startups. Our research provides a general analysis on the question if certain business model patterns result in higher chances of success and, hence, contributes to business model, strategy, and entrepreneurship research.

5.2 Contributions for Practice

For practice, the results provide a starting point for entrepreneurs supporting their business model design. First, the findings indicate that the business model does influence startup success. This gives business model decisions a new level of importance for entrepreneurs. Second, the paper indicates practical guidance on which business model pattern entrepreneurs may focus to increase their chances of success. We discovered business model patterns that increase the chances for survival (i.e., *Freemium* and *Subscription*) as well as patterns that decrease it (i.e., *Cross Selling*, *Hidden Revenue*, *Layer Player*, and *No Frills*). Hence, the findings provide clear and straightforward support for startups' fundamental decisions concerning the business model.

5.3 Limitations

This study has some limitations. First, we agree with the remarks emphasized by Brea-Solís et al. (2014), Rietveld (2017), and Teece (2010) that there is no *one* successful business model. Moreover, Weill, Malone, and Apel (2011) found that the business model preferred by investors varies from time to time. Second, the analysis explaining startup survival does not show a strong effect size. This might be because there are many other influencing factors we did not control for yet, such as factors related to individual entrepreneurs, e.g., personality, experience, education, bad luck, and entrepreneurial talent, organizational factors, e.g., legal form, team size, industry, and the funding or self-financing, and environmental factors, e.g., markets, competition, workforce quality, region, and sector-specific conditions (Cressy, 2006; Strotmann, 2007; Krishna et al., 2016; Antretter et al., 2018). Nevertheless, we found two business model patterns with significantly lower failure rates and four patterns with significantly higher failure rates indicating rather successful and rather not successful patterns.

6 Conclusion and Future Research

Research still lacks clear determinants for business performance, in particular in entrepreneurship (Cooper, 1993; Spiegel et al., 2015). Research qualitatively shows that business models matter for firm performance (Zott et al., 2011; Lambert and Davidson, 2013; Foss and Saebi, 2017; Massa et al., 2017). However, neither entrepreneurship research nor business model research proofs the relationship of business models and business performance quantitatively (Al-Debei and Avison, 2010; George and Bock, 2011; Lambert and Davidson, 2013; Spiegel et al., 2015). Hence, we analyze this relationship with a dataset of 500 startups building on business model patterns (Gassmann et al., 2013) and startup survival as proxy for success. We find a significant relationship for 15 out of 55 business model patterns. Two indicate higher chances of survival (i.e., *Freemium* and *Subscription*), whereas four point toward lower chances of survival (i.e., *Cross Selling*, *Hidden Revenue*, *Layer Player*, and *No Frills*).

This research contributes to strategy, business model, and entrepreneurship research. To the best of our knowledge, this is the first large-scale quantitative-empirical study using startups and business model patterns. For practice, results provide decision support for entrepreneurs and strategy development. However, small effect sizes indicate the early state of this study and opens up avenues for future research. To clearly separate the influence of the business model, moderating and controlling variables are needed. Future research can consider markets, regions and industries since they can affect startup success (Strotmann, 2007). Further research can consider moderating constructs, such as funding, investors, or digital traces (Antretter et al., 2018). Moreover, similar analyses can consider established firms to investigate emerging business models such as multi-sided platforms (Hein et al., 2018, 2019) or transformations in traditional industries (Weking, Brosig, et al., 2018; Weking, Stöcker, et al., 2018). Concluding, the research at hand provides first significant results for the relationship of business models and business performance and opens fruitful avenues for further research.

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