

The Effect of Business Model Innovation Announcements on Share Prices – A Study of US Listed Technology Firms

Jan Abrahamsson¹, Anastasia A. Maga², and Christopher Nicol³

Abstract

Purpose: The purpose of this paper is to examine the immediate effect of different types of business model innovation behavior by US listed technology firms on the market performance of equity securities, in this case the share prices of the firms in question.

Design/Methodology/Approach: This study employs a quantitative research design, based on stock market data of US listed technology firms. A sample of 147 firms were chosen, considering the time period of 2014-2016. The stock market data was then matched with secondary data, outlining the firms' business model innovation behavior.

Findings: Our findings indicate that the stock market awards frequent business model innovators more than less frequent business model innovators, controlling for factors such as sub-industry belonging and proxies for size of the firm.

Research limitations/Implications: The study is one of the few that connects business model innovation with stock market performance and thus contributes to research by empirically connecting business model innovation with different performance metrics. Obviously, the study has inherent limitations in terms of single industry, a single stock market and variables used.

Practical Implications: Practical implications to be drawn from this study includes evidence towards how the stock market values and awards announcements of business model innovations, which is of value for corporate executives, investors and stock market analysts alike.

Originality/Value: Our study brings new insights into how business model innovation is perceived by stock market analysts and investors and consequently how announcing business model innovations can be used as a managerial tool by management to improve the firm's performance on capital markets.

Keywords: Business models, business model innovation, stock market, share prices, high-tech, innovation, business model portfolios

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¹ Management consultant

² Stamford International University, Bangkok

³ Umeå School of Business and Economics

Introduction

Over the past decades, several studies and meta-studies (e.g. Rosenbusch et al. 2011) have indicated an overall positive connection between firms' innovative behavior and their performance metrics. That is, in terms of their financial performance, extended market share or international expansion, among other things. While many previous studies have focused upon issues including R&D expenditure as a proxy for innovation, or perhaps on the release of new products and linked these types of innovative behavior to performance, significantly fewer studies have looked at business model innovation (BMI) and its contribution to a firm's performance on a larger scale.

Business models are a conceptualization or a description of how a firm do business (Zott and Amit 2007) and consist of several inter-related dimensions, such as value creation; value delivery and value capture, as well as, frequently, value proposition and value network (e.g. Shafer et al. 2004; Osterwalder and Pigneur 2004; Clauss 2016). Business model innovation is, consequently, a change that the focal firm undergoes in either one or several of these dimensions, or its accompanying resources, capabilities or external relationships (Gerasymenko et al. 2015).

A plethora of case study evidence on business model innovation gives credence to the transformative effects that business model innovations can have for a firm, in terms of new business opportunities are being captured, new revenue streams being opened and increased profitability (Abrahamsson 2016). While business models and business model innovation have often focused on startups or other forms of younger, entrepreneurial ventures (e.g. Johansson and Abrahamsson 2014; Malmström and Johansson 2017), its importance is arguably at least at the same level for more established firms. Furthermore, a study conducted by IBM in 2006 found that companies with a focus on business model innovation had an annual compound growth rate of five times, or more, than firms that have an innovation focus geared towards either operations or new products and services. Similarly, Kim and Min (2015) underline how adding new business models positively affects incumbent firms' performance, contingent on the right alignment of potentially conflicting assets between the new and the

old business model. Moreover, Zott and Amit (2007) further emphasize the performance effect of different business models, discovering that innovative business models positively affects firms' stock market value. Furthermore, the authors emphasize business model innovation as a source of wealth creation for firms.

Established incumbent firms can often be found as publicly listed companies on the stock market. Any significant business model relevant changes in company operations must, therefore, be communicated to the public. Provided that the performance effects of business model innovation are often assumed to be positive, such news or announcements ought to positively affect the firm share price, assuming an efficient or at least a semi-efficient market. In some instances, however, business model innovation can pose challenges for companies. For instance, by adding a new business model which yield conflicting assets for the focal firm. This can be exemplified by bringing a new online business model into a brick-and-mortar company. As such, assets are not complimentary in regard to the new and the old business model, which can have negative potential business performance impacts (Webb 2002; Kim and Min 2015) and thus potentially influence stock market performance negatively as well.

Previous studies have examined the stock market impact of non-financial information announcements (Eccles, Krzus, and Serafeim, 2011) in a similar fashion; such as that related to governance and sustainability. These studies found positive effects, although no extant research focused on business model innovation information, which we argue, might create an immediate effect on the market performance of listed companies' shares. While business model innovation can be challenging and a risk to undertake (i.e. Kim and Min 2015), the risk of not undertaking it, can be worse. *"... the greatest innovation risk a company can take is to decide not to create new businesses that decouple the company's future from that of its current business units"*. (Christensen et al. 2016, p. 40)

In particular, we are interested in the reactions from the buy-side to announcements of business model innovation, causing an outperformance in share prices of companies. Market performance at the securities level has been viewed as one of the more immediate

indicators of market interest especially from the buy-side (Derwall, J., Koedijk, K., & Ter Horst, J., 2010; Hong & Kacperczyk, 2009 etc.) and can be taken as a measure of the business model innovation expectation effect. It needs to be noted that along with the significance of market performance for the buy side, the sole motivation for purchase being the expectation of future appreciation of the asset and the subsequent sell, there is no conclusive evidence linking the investor perception of BMI, or any other non-financial news announcement, to an actual improvement in the firm's operations or competitive position (Barber, Heath, Odean, 2003). Subsequently, as long as the firm's dividend policy thus becomes irrelevant the possible actual improvement is largely redundant for the buy side as well (Miller and Modigliani, 1961).

The purpose of this paper is, therefore, to examine the immediate effect of business model innovation behavior on the market performance of equity securities. Hence, our explicit research question is:

What are the stock market performance implications of announcements of business model innovation?

Importantly, we appreciate that no organization exists within a vacuum, that is other elements such as strategy, competitive advantage and positioning are also highly relevant to their success. These are, however, beyond the scope of our focus. Concretely, we study a random sample of 147 market listed technology companies from the USA and the firms' business model innovation behavior within the time period of 2014-2016, with quarterly aggregated stock market data.

The paper is organized as follows: we review the extant literature on the object of study, followed by describing the research methodology, and subsequently display the results of the study, which are analyzed and discussed. Finally, we will deliver relevant further recommendations for academia and managerial practice, based on our findings and analysis.

Literature Review

Business Models and Business Model Innovation

Whilst business models in terms of creation, delivery, and appropriation of value, have arguably always been

tacitly integrated in the economics of doing business (Teece 2010), it is only in recent decades that the concepts have gained more conceptual clarity within academia. The modern wave of business model research chiefly emanates from the IT boom at the end of the last millennium when new technology (fueled by the emergence of the Internet and e-business) necessitated new business models to explain how companies would create and capture value from the technical innovations brought to the market (Magretta 2002; Zott and Amit 2011).

Business models can broadly be viewed upon as representations of how firms do business (Zott and Amit 2010; 2013). However, definitions that are more precise have offered differing perspectives over time. Shafer et al. (2005), for example, view business models as the following: "*we define a business model as a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network*" (Shafer et al. 2005, p. 202). Doganova and Eyquem-Renault (2009) however, consider business models to be a scale model of a new venture, which has the purpose of demonstrating the venture's feasibility and can be facilitated to attract necessary external partnerships (financing, customers, suppliers etc.).

Other scholars, however, such as Osterwalder et al. (2005) and Teece (2010) connect elements of a business model back to the underlying mechanisms of value creation and value capturing provided by Shafer et al. (2005). Thus, they deliver a more tangible depiction of business models than the scale model representation of a venture, as suggested by Doganova and Eyquem-Renault (2009). Intrinsically, Osterwalder et al. (2005) and Teece (2010) share a broadly similar view, as they essentially view business models as the design of how to identify, create and deliver value and how to capture parts of this value (generated by a particular business model) back to the focal firm.

Beyond what can be considered the core dimensions of a how business model (i.e. how value is created, delivered and captured) perspectives on value propositions and value networks can also be incorporated (i.e. Shafer et al. 2005; Clauss 2016). The value proposition is a representation of the unique customer value that the firm's business model brings to the customer and subsequently which customer pains it will solve

(Chesbrough 2010; Lindgren et al. 2010; Clauss 2016). The notion of value network highlights that creation and capturing of value takes place in a context of partnerships, external to the focal firm. These include suppliers, customers and other stakeholders in the network or business ecosystem (Shafer et al. 2005; Lindgren et al. 2010; Autio et al. 2017).

Business models cannot, however, be static structures because their ability to create and capture value can greatly be diminished, especially in dynamic contexts such as high technology, where business model innovation should accompany technological innovation for the focal firm (Teece 2010).

What constitutes an actual business model innovation, and not just an incremental change or adjustment of the business model, has been discussed in academia (e.g. Björkdahl and Holmen 2013; Gerasymenko et al. 2015).

Gerasymenko et al. (2015) argue that a company needs to undergo what they call "substantial business model change" in order that the change to the current practice is enough to be a real relevant business model innovation.

As such, substantial business model change refers not only to the generation of revenue or cost management (i.e. creating and capturing value), but also change that affects the firm's core resources, capabilities or external relationships such as the value network and the focal firm's position within the value network (Gerasymenko et al. 2015). Business model innovation can, moreover, emerge organically within an organization, through the deployment of dynamic capabilities (e.g. Teece 2010; Al-Aali and Teece 2013; Abrahamsson 2016) for example. To exemplify, business model innovation can disrupt an existing industry (Christensen et al. 2016) by bringing in a new business model, such as AirBnB connecting apartment owners with visitors (Ritter and Lettl 2017) and thus disrupting the hospitality industry by bringing buyers and sellers together on a digital platform. However, perhaps more common are business models which are new for a focal company. A well-known example of this is Amazon, innovating its portfolio of business models to encompass not only e-commerce, but also B2B focused cloud-based web services (Ritala et al.

2014). The above examples fit into the definition of substantial business model innovation, as they imply new management of costs and revenues, new value network relationships, new resources and capabilities. For the purpose of this study, these are the types of substantial business model innovations we seek to distill, as they are the ones most likely to impact performance, in our case stock market performance. While for instance a minor change in customer segments targeted can constitute a business model innovation (Osterwalder and Pigneur 2010), it can scarcely be considered a substantial one and would likely have a relatively small impact on stock market performance. Hence, only business model changes that can be considered substantial business model innovations are considered in this paper. This also excludes mere product innovations, such as releasing a new or incrementally updated product or product lines.

In addition to developing business models organically, firms can also add new business models by engaging in mergers and acquisitions (M&As) and, thus, develop portfolios of business models (Christensen et al. 2016; Aversa et al. 2017). Here, an acquired firm's business model is used in parallel to the acquirer's business model. Such an addition of an "acquired" business model can, of course, also be considered substantial business model innovation for the acquiring firm - provided it is substantially different from the firms' existing business model(s). As argued by Christensen et al. (2016), new business models through M&As can lead to internal disruption of the business, necessary for renewal and growth.

Stock Market Performance and Business Model Innovation

Market performance at the securities level has been viewed as one of the more immediate indicators of market interest, especially from the buy-side (Derwall, J., Koedijk, K., & Ter Horst, J., 2010; Hong & Kacperczyk, 2009 etc.). Special attention was paid to stock price volatility as an important factor in the comparison of risk and reward between stocks and other securities (Ambrosio, 2008). Historical data on stock volatility can, thus, be taken as a measure of a companies' performance and linked to independent variables, such as business model change. Though current research lacks evidence of such a relationship, there have been attempts to prove the existence of such in adjacent areas.

The extant research abounds in evidence of a relationship between innovation and market value. Stock price volatility has been linked to innovative practices of firms. Pakes (1981) finds a positive correlation between market value and patenting activity, whilst Hall et al. (2005) relate stock performance to R&D practices. Mazzucato (2006) examines how innovation dynamics affect expectations about future firm growth through stock volatility, where a significant relationship between the intensity of innovation and stock volatility is discovered. Business model innovation can also be seen as a more sustainable form of innovation, which is more difficult for competitors to imitate or replicate than mere products or operational processes (Amit and Zott 2012), which should add to the attractiveness of business model innovation for stock market investors.

As for innovation in business models, the current research lacks findings in this area. Amit and Zott (2009) explore the change in Apple stock prices after the iPod business model was introduced, they disregard, however, the fact that a more significant change happened after the introduction of the second business model (iPhone), which proves our position. To note, when referring to iPod and iPhone here we are not referring to the products as such, but to the new business models and ecosystems surrounding these two products. The business model of iTunes, that is the system for purchasing music for the iPod, for example. Another is the integration between the App Store and carrier partnerships creating the iPhone's surrounding business model. As such, Apple is also a prime example of the adage of Teece (2010), which is that technological innovation often is accompanied by business model innovation. Consequently, the link between business model innovation (BMI) and share performance has not been established, instead of which the BMI engagement was linked to financial performance thus leaving the BMI-to-stock correlation an open question.

However, as it is put by many the fluctuations of stock prices are not necessarily affected by companies' financial performance, but rather by manipulations, rumors and speculation among the buy-side market participants (Fenton O'Creevy et al., 2005; MacKenzie, 2006; Shamsudin, Mahmood, & Ismail, F., 2013) thus, BMI (when announced) can have an immediate effect upon the share price. The link between non-financial

information announcements and stock price fluctuation was proved in Eccles, Krzus, and Serafeim (2011) and a number of other studies. Additionally, Kim and Youm (2017) found that social media postings made by the focal company or its customers could influence analysts' stock recommendations and, subsequently, the share value. Such social media postings may for instance be concerning business model innovations. Therefore, we conclude that market reactions should follow the announcements of significant business model changes. In summary, the market's knowledge regarding business model innovation, in publicly listed firms, is likely to be an example of news and announcements that the market should react to positively. This is further supported by past research, highlighting links between business model innovation and different firm performance metrics (i.e. Zott and Amit 2007; Kim and Min 2015).

Evidence also points towards the fact that firms, repeatedly engaged in business model innovation, achieve higher growth in operating margins as compared to firms engaging in other types of innovative behavior, such as product innovation (IBM 2006). Considering these arguments regarding stock market behavior and business model innovation, we present the following two hypotheses:

Hypothesis A: Announcements of business model innovation have a positive effect on market performance of equity securities within high tech industries.

Hypothesis B: The amount of business model innovation announcements positively affects the market performance of equity securities within high tech industries.

Methodology

The data used in this study comes from two different sources. First, the historical stock prices of US companies listed in financial markets were derived from Bloomberg data terminal. Second, BMI engagement by the chosen companies was identified through analyzing public announcements of business model innovation, published on the companies' websites, press releases, business press articles and financial statements. The definition of BMI and, thus, the

identification of BMI activities from the secondary data, was done by using the definition of substantial business model innovation, as provided by Gerasymenko et al. (2015). I.e. focusing on business model change that influences how the focal firm generates revenues or manages its costs, but also considering areas such as core resources, competences/capabilities or relationships. It should also be noted that M&A activity could constitute a new business model, assuming the acquired firm has a different business model than the acquirer, which is in accordance with Christensen et al. (2016). Substantial business model innovation would hence not include, for instance, a change in customer segment targeted. Nor release of new products or product lines, as that would be in the realm of product innovation (e.g. Teece 2010; Gerasymenko et al. 2015; Abrahamsson et al. 2019).

A sample of 147 companies publicly listed in the United States was randomly selected from 3000 listed technology firms, over the period of 2014 - 2016 by the quarter, derived from the Bloomberg Terminal software. Bloomberg (2017) divides the technology sector into nine different sub-industries, namely *Technology Hardware and Storage*, *Technology Hardware and Equipment*, *Software and Services*, *Software*, *Semiconductor and Semiconductor Equipment*, *IT Services*, *Internet Software and Services*, *Electronic Equipment*, *Instruments and Components* and *Communication Equipment*. The technology sector was chosen for its perceived high degree of change and potential for business model innovation. In other words, the rate of technological change in the industry should be matched by also announcing and implementing new business models often, in line with Teece (2010). Therefore, we chose the high-tech sector as a potentially fertile ground for this research endeavor.

Given the complexity of market performance and in response to calls for a more detailed assessment of multiple performance indicators (Miller, Washburn, & Glick, 2013), we focus on 4 market performance indicators: exponential growth, CAGR, earnings per share (EPS), and volatility expressed by standard deviation.

CAGR – Compound average growth rate used in investment as a measure of geometric progression, which

assumes that a variable (say share price) grows at a constant rate of return compounded over a sample period of time (Anson et al, 2010). The advantage of using CAGR method is stated as a tool able to provide data on how the investment performed over a period of time provided the investment securities have the same starting date, thus CAGR (IVESCO). It is calculated as follows:

$$\text{CAGR} = [(V_n/(V_0))]^{1/n} - 1$$

Where

V_n is the ending value

V_0 is the beginning value

n is the number of steps (years/ time periods) between the values to compare

Exponential growth, that is predicting exponential growth by using existing data, is a pattern of data that shows greater increases with passing time, creating the curve of an exponential function. Exponential growth formula has many uses in finance, financial modelling being only one example, stock prices on the other hand have only recently been discovered to demonstrate exponential growth patterns (Jackwerth and Rubinstein, 1996; Stango and Zinman, 2009; Dempsey, 2015), where the growth rate proxies for expected return (Leiss, Nax, Sornette, 2015).

The formula for exponential growth of a variable x at the growth rate r , as time t goes on in discrete intervals, is

$$x_t = X_0 [(1 + r)]^t$$

where X_0 is the value of x at time 0.

The rate, thus, shows a growth trend over the measured time; the growth rate over 100% means that the stocks more than doubled in price over the period, the rate of 200% means tripling, etc.

Standard deviation of stock prices - in finance, standard deviation is a commonly used statistical measure, which is applied to the annual rate of return of an investment; it shows historical volatility of the investment. The higher the standard deviation of a security

the higher the price range of that security over time. It is calculated as follows:

$$\sigma = \sqrt{((\sum(x - \mu)^2)/N)},$$

Where

x – price of individual stocks in the population
 μ – mean of the individual stock price over time
 N – number of stocks in population

To test the hypotheses we need some additional controls, as a proxy for firm size we are using 'market cap', the measure considered to be forward-looking, market oriented, and involves firm growth opportunities and equity market condition (Li, Dang, 2015, 2018); and to avoid local effects we are using sub-industry dummies. The measures used have certain drawbacks when applied to investment securities historical prices. CAGR does not show possible volatility and standard deviation does not show negative movements of security prices. To eliminate those drawbacks, we combine the measures and run multiple regression on standard deviation of stock prices to CAGR to find the value of R , with stronger correlation of volatility to more positive growth indicating abnormal positive returns to market value.

Results

To test the hypotheses, we specify and estimate a set of similarly unrelated regressions (SUR) with market indicators as dependent variables (DVs) and BMI as core independent variable (IV), controlling for market capitalization and industry affiliation of the firm. The lack of other, especially general market, controls is based on our assumption of the efficiency of the US stock market, which implies that all relevant information immediately becomes reflected in the stock prices (Fama, 1970, 1991, 1998) as later evidenced in Malkiel (2003) and Fenton O'Creevy et al. (2005), which claim that the market price itself is a perfect gauge of all relevant information and the way market reacts to it. As market performance indicators are likely to be affected by the same unobservables, SUR is a preferred specification as it allows to account for contemporaneous correlations (Greene, 2012). We include market cap as a proxy for firm size (DeAngelo, DeAngelo, and Stulz, 2006; Dang and Li, 2015, 2018) and sub-industry

dummies to account for sector-specific effects – whilst all the firms in the sample belong to high technology class, the BMI effects are likely to depend on the specific line of business of each company.

The results suggest that only two out of four models as significant at conventional level: DV1: growth ($p=0.0162$) and DV3: CAGR ($p=0.0045$). Both hypotheses are fully supported in these models as firms exhibiting high rates of business model innovation (BMI=2) exhibit higher growth ($\beta=8.238$, $p<.1$) and CAGR ($\beta=0.020$, $p<.01$) in comparison to firms with no or low levels of BMI. While we observe that rate of BMI is not reflected in share price volatility and earnings per share at conventional significance levels, the direction of the effect of BMI on earnings per share is in line with the expectations, as innovating multiple elements of the business model is positive ($\beta=1.546$) (Table 1.).

However, it should be noted that stock prices do not depend on the actual implementation of BMIs in the companies (rather on their announcements) reflecting the market expectations of future BMI performance. The actual BMI performance is reflected in accounting results, which do not necessarily cause market reactions. Thus, the announcements of BMI bear more significance to the buy-side market reactions.

Discussion

This paper set out to investigate whether business model innovation (BMI) influences the market value of equity securities, in this case common stock, in the context of high technology firms publicly listed in the United States. As such, the paper has yielded several interesting findings, to be further discussed in this section.

Firstly, the announcement of a single new BMI announcement did not yield a strong positive reaction from the stock market across our four dependent variables. In fact, in some cases the responses to such an endeavor were seen as a negative by the stock market, as measured by the coefficient. However, for exponential growth and cumulative growth, we noted a positive relationship for single business model innovation, although not quite a statistically significant one. While this does not support our first hypothesis fully in terms

	Model 1. DV ₁ : growth				Model 1. DV ₂ : Volatility				Model 3. DV ₃ : CAGR				Model 4. DV ₄ : epst12m			
	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	t	P>t
BMI																
1	3.468	4.162	0.830	0.405	-0.328	1.661	-0.200	0.843	0.010	0.006	1.530	0.127	-0.184	0.594	-0.310	0.757
2	8.238	4.681	1.760	0.079	0.800	1.868	0.430	0.669	0.020	0.007	2.810	0.005	1.546	0.668	2.310	0.021
Marketcap	0.000	0.000	0.730	0.466	0.000	0.000	0.580	0.562	0.000	0.000	1.350	0.178	0.000	0.000	1.070	0.284
Subindustry																
COMH	10.147	12.389	0.820	0.413	7.002	4.945	1.420	0.157	0.042	0.019	2.200	0.028	1.663	1.769	0.940	0.347
COMS	15.697	13.270	1.180	0.237	6.874	5.297	1.300	0.195	0.038	0.021	1.840	0.067	2.158	1.894	1.140	0.255
DEF	85.511	23.205	3.690	0.000	11.001	9.263	1.190	0.235	0.019	0.036	0.540	0.589	0.009	3.313	0.000	0.998
ECE	-0.286	23.205	-0.010	0.990	-1.967	9.263	-0.210	0.832	0.012	0.036	0.350	0.730	0.628	3.313	0.190	0.850
EOE	-0.204	23.205	-0.010	0.993	0.095	9.263	0.010	0.992	0.025	0.036	0.700	0.486	0.972	3.313	0.290	0.769
INT	12.776	14.030	0.910	0.363	7.188	5.600	1.280	0.200	0.029	0.022	1.330	0.185	-0.250	2.003	-0.120	0.901
SEMC	6.140	12.338	0.500	0.619	7.816	4.925	1.590	0.113	0.048	0.019	2.510	0.012	2.486	1.761	1.410	0.159
SFIN	13.926	23.205	0.600	0.549	3.058	9.263	0.330	0.741	-0.030	0.036	-0.820	0.412	-1.240	3.313	-0.370	0.708
SOFT	12.376	12.157	1.020	0.309	5.964	4.853	1.230	0.220	0.024	0.019	1.260	0.207	1.319	1.736	0.760	0.448
TELCE	0.314	14.229	0.020	0.982	0.697	5.680	0.120	0.902	0.030	0.022	1.340	0.180	1.266	2.031	0.620	0.533
const	13.089	11.602	1.130	0.260	4.088	4.631	0.880	0.378	-0.030	0.018	-1.660	0.097	-0.436	1.656	-0.260	0.792
R ²	0.1526				0.0616				0.1880				0.1229			
F	2.09				0.73				2.43				1.36			
P	0.0162				0.7209				0.0045				0.1833			

Table 1: Effects of BMI on market performance: estimates from seemingly unrelated regressions

of statistical significance, there are several interesting possible explanations. One could be that a single new business model innovation, i.e. completely re-directing the company's business, can have negative performance impacts in the short-run. As this study only measures relatively short-term investor reactions, risk-averse investors could therefore decide to react negatively to announcements of these types of potentially risky business model innovations.

This is of course consistent with notions of BMI being a risky endeavor to pursue (e.g. Yip 2004; Christensen et al. 2016), as it can be likened to moving from one equilibrium position through the disequilibrium to find the new equilibrium, i.e. the new business model (Yip 2004).

Secondly, and conversely, when looking at firms announcing two or more business model innovations in the period of the study, we can see a very clear positive relationship with such announcements and stock market reactions for two out of four dependent variables, which supports our B hypothesis regarding quantity of business model innovation. For the other two variables, volatility and earnings per share; results were close to but not quite significant, especially for earnings per share. Obviously such firms are highly probable to engage in so-called business model portfolios (Abrahamsson 2016; Aversa et al. 2017) and, thus, operate their business in a multiple business model regimen. According to Aversa et al. (2017), a company with a business model portfolio has at least two simultaneous approaches for either creating or capturing value. As a company innovates and creates new business models, it does not necessarily mean that the old business model is abandoned but they rather co-exist, such as web services and e-commerce in the case of Amazon (Ritala et al. 2014; Kim and Min 2015; Christensen et al. 2016).

From an investor's point of view, it can be argued that BMI activities undertaken as part of a business model portfolio can reduce the expected risk of the BMI. Thus, markets react positively to multiple BMIs pursued by companies, rather than singular non-portfolio BMI engagements. This is in line with Christensen et al. (2016), who argue that business model portfolios are beneficial for companies, including business models coming from M&A activities. Furthermore, portfolios,

from a financial point of view, have the inherent ability to reduce risk through diversification.

The same logic can be applied to business model portfolios as business models can be viewed as key, albeit intangible, assets (Abrahamsson 2016) for a company. This is due to how a business model can potentially impact profits and losses for the company and that it has the ability to enable business opportunities (Barney 1991). Consequently, having a business model portfolio provides a form of asset diversification and asset diversification reduces risks for investors. Therefore, stock market investors may look more favorably at companies with business model portfolios engaging in multiple business model innovation activities affecting only certain markets, technologies, business units or subsidiaries, as compared to firms pursuing a single, company-wide business model innovation.

Conclusions and Implications

As this study aimed to investigate the potential effects of business model innovation on the market price of equity securities and stocks, a number of conclusions and implications can be made based upon the findings of the study and the discussion of those findings.

Stock market investors tend to be risk-averse, as the risks of investing money in stocks is generally substantially lower as compared to, for instance, new venture investment by business angels or venture capitalists (Hogan et al. 2017). However, especially in the dynamic field of high-technology, coming up with and implementing new business models, is pertinent for remaining competitive and in the case of high-tech firms in this study, achieving a fit between their technical innovations and vending those innovations to the market. New business models are, however (as with any larger, transformative, change within a firm) an inherent risk (Yip 2004).

Risk-averse stock market investors, hence, might (accordingly) not react positively to a singular business model innovation, whose intent is to transform a company and therefore the company's future is "bet" on that new business model in question. The same risk-averse investor will more easily, however, embrace a company that is already engaging in multiple business

models, thus conducting several business model innovation endeavors within the portfolio. Such BMI activity by business model portfolio firms does not “bet” the company on a single model change and allows the company to pursue a multitude of diversified business opportunities across different markets and technologies. And as such, it elevates concern of bad short-term performance due to BMI by stock market investors, as the impact would likely be smaller than in the case of singular BMI.

This study, however, only considers relatively short-term effects of BMI announcements. Over time, companies in a single business model regimen might still benefit greatly (in terms of performance) with the new business model. That being said, this study has its focal point more on investor perceptions than actual business performance. That is also a limitation of this study, others include a single country-focus, a relatively few number of firms and a single industry. Further research in this area might do well to mitigate all these factors, as through looking at cross-country samples across a few or several different industries.

Another limitation to our research is the limited information regarding the precise number of BMIs within the companies, which did not allow us to assign continuous values to the BMI variable; nevertheless, it can be done in the future studies.

Regardless of the study’s limitations, it contributes to recent academic debates with regard to business model innovation and the effects of different types of performance that business model innovation can have. Few studies have looked at BMI in conjunction with stock market data before and more studies of this type are likely needed to solidify results for more generalized conclusions.

Finally, the study gives the signal to managers in high-technology listed firms that business model portfolios and multiple business model innovation, while each being smaller “bets” is looked upon favorably by stock market investors in the short term and can, therefore, also be good for the focal company in the shorter term. Hence, the study provides empirical support to the notion that listed firms should dare to be innovative and experiment with several concurrent business models in order to pursue new growth opportunities, as the stock market rewards such behavior and the (arguably) balanced risk profile of this type of innovative behavior.

Whether pursuing a business model portfolio strategy provides superior benefits in the long-term as opposed to a single business model regimen, is, nevertheless, not answered by this study because this study only considers the relatively short-term effects of business model innovation announcements rather than long-term effects of new business model implementation

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About the Authors

Dr. Jan Abrahamsson, Jan Abrahamsson completed his doctoral thesis in the areas of business model innovation and international entrepreneurship at Umeå School of Business and Economics in 2016. After tenures of research and lecturing in entrepreneurship and innovation in for instance Toulouse Business School in France and Stamford International University in Bangkok, Thailand, he now works in Sweden as a management consultant, with a focus on innovation management. Dr. Abrahamsson also have previous professional experience working with technology startups in diverse roles such as co-founder, part of the management team or as an adviser, as well as new venture financing.



Dr. Anastasia A. Maga, Dr. Anastasia Maga completed her doctoral work at the Transbaikalian State University, Russia in 2007. An accomplished researcher, Dr. Maga has been published in dozens of international journals. Her depth of knowledge also expanded to publish a number of academic textbooks and monographs. Specializing in finance and economics Dr. Maga has also consulted in the private and public sector as an expert and international project manager. She currently lectures in the BBA program at Stamford International University, Bangkok.



About the Authors

Dr. Christopher Nicol, is an Assistant Professor at Umeå School of Business and Economics, working within the Management Section. Christopher's research is, principally, focussed on the area of Institutional theory and change, and he holds a keen interest in how change is driven within organisations. Moreover, he is eagerly involved with teaching at various levels in a myriad of areas in business administration.

Christopher holds a BSc from the University of Bradford, School of Management, in the UK and a Licentiate and PhD in Business Administration from Umeå University, Sweden. Moreover, he is frequently involved in Management consultancy projects in SMEs. He also has previous professional work experience in sales and sales management within British and American multinationals.

