VALUE CREATION IN E-BUSINESS
AS A DRIVER OF FINANCIAL PERFORMANCE:
INVESTIGATING BUSINESS MODELS
OF POLISH INTERNET COMPANIES

Piotr Zaborek[1]
Tymoteusz Doligalski[2]
Sylwia Sysko-Romańczuk[3]

Abstract

The article presents the findings of a survey of managers of Polish internet companies investigating links between e-business value creation and financial performance. The theoretical framework was developed by Amit and Zott that conceptualized the main sources of value in internet-enabled companies. The study included 150 businesses with the largest representation of internet retailers and service providers. The major outcome of the study was developing logistic regression model that allowed to establish which variables were statistically significant predictors of the operational return on sales ratio. It implied that out of the four elements comprising Amit and Zott's framework only Complementarities were closely linked with improved financial performance. The other two elements – Lock-in and Novelty – were not viable predictors, while the forth component – Efficiency – was negatively related to the performance metric.

Key words: business models, value creation, e-business, e-commerce, Internet.

[1] Szkoła Główna Handlowa w Warszawie, Instytut Międzynarodowego Zarządzania i Marketingu / Warsaw School of Economics, Institute of International Management and Marketing

[2] Szkoła Główna Handlowa w Warszawie, Instytut Informatyki i Gospodarki Cyfrowej / Warsaw School of Economics, Institute of Information Systems and Digital Economy

[3] Szkoła Biznesu Politechniki Warszawskiej / Warsaw University of Technology Business School

1. Introduction

In recent years, the concepts of a business model and value creation have become popular topics in academia. In particular, e-business as a novel form of a company's operation has been attracting researchers' attention. In spite of this, there were only a few attempts to investigate the links of these notions with financial outcomes through quantitative methods. To outline the current state of knowledge on these issues, we begin this paper with a short review of selected, pertinent previous studies. It is worth noting that some of the below cited authors in writing about ideas similar to business models use different terms such as strategies (Hax, Wilde, 2010), capabilities (Zhu, 2004) or competences and assets (Soto-Acosta, Meroño-Cerdan 2008).

Describing the modus operandi of companies in the networked economy Hax and Wilde distinguished three strategies (2010). The best product strategy concentrates on offering superior products, which receive more of a company's attention than customers and their needs. In a contrasting strategy, named total customer solutions, it's customers that a company cares the most about and strives to develop long-term relationships with. In the customer lock-in strategy a company builds a platform that serves as an environment (e.g. marketplace) where customers may interact with their preferred service and product providers. Hax and Wilde linked the three strategies with financial outcomes of firms quoted on NASDAQ. They found that the most beneficial in terms of both added market value and the relationship of market to book value was system lock-in, followed by total customer solution and best products. The average profitability metrics for the three strategies were widely different, however they also displayed large within-group variances, which compromised validity and reliability of the findings.

Zhu (2004) looked at the outcomes of American retailers selling online through the lens of four e-commerce capabilities, including providing information, transaction facilitation, customer service and integration of internal processes. In his study, financial performance was positively correlated with these capabilities, moderated by a variable depicting the level of IT-infrastructure development.

Soto-Acosta and Meroño-Cerdan (2008) looked into the influence of internet assets and competences on e-business value creation. Here, e-business value creation was defined in terms of benefits in procurement and supplier relations. The study found that both external and internal e-business capabilities were positively related to e-business value. In contrast, the internet resources, such as the use of various technological solutions (e.g., intranet, extranet or LAN) did not have a positive effect on e-business value. These findings imply that technical resources without the right set of competencies are meaningless.

In the Polish literature, there have been several studies investigating e-business models with a quantitative approach. They pursued different objectives, which rarely included financial aspects of internet business. Instead, the previous Polish research addressed the categorization of e-business (Nojszewski, 2006), innovation

and institutional aspects (Szpringer, 2012), systemic approach (Doligalski, 2014), business model components and growth modes (Sysko-Romańczuk, Doligalski, 2016). In 2015 we published a paper proposing a segmentation of Polish online companies based on their value propositions, which constitutes a core element of every business model. This quantitative study did not reveal any statistically significant differences in financial performance among companies belonging to different segments (Doligalski, Zaborek, Sysko-Romańczuk, 2015). In light of the above, it seems that there exists a major gap in the understanding of e-business models and their effects on financial performance. In this paper we sought to contribute to bridging this gap.

2. Conceptual framework

The objective of this study[4] was to establish to what extent various forms of value creation by Internet companies can be associated with improved profitability. Profitability serves here as the synthetic measure of efficiency of investigated companies. Admittedly, it is not a perfect measure, overlooking various specific aspects of efficiency such as operational, marketing and innovative, but it is one of a few feasible methods to use in a quantitative approach to compare and contrast a large number of diversified firms. Trying to establish efficiency through a more precise approach would call for more specific information on each company that would be difficult to collect through standardized survey forms and would be more suitable for case-study research. These and other issues with measuring efficiency in IT companies were extensively discussed by Zaborek (2012).

The theoretical framework informing this research was based on a value creation model originally proposed by R. Amit and C. Zott (Amit, Zott, 2001). The presence of various elements of Amit and Zott's concept was measured with a Likert-type 7-point scale comprising a list of statements about four value drivers of the model including: Novelty, Lock-in, Complementarities and Efficiency (see Table 1 for the complete set of items used on the questionnaire). According to Amit and Zott these four categories represent groups of factors that can enhance the total value created by e-business. In particular, they refer to the following specific kinds of business solutions:

— **novelty** is defined by the level of uniqueness of goods or services offered by a firm with regard to how the customers' needs are satisfied and what those needs are; thus novelty can be achieved by devising new ways of satisfying existing needs or finding and addressing entirely new needs;

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[4]   The previous version of this paper was presented at the 4th EMAC Regional Conference in St. Petersburg, Russia, 25–27 September 2013. The current article has been augmented by the addition of a literature review, an extended discussion of findings, limitations and further research directions.

— **lock-in** concerns the various kinds of costs that customers need to bear in order to replace the firm's offering with one of competitors'; it is assumed that the higher are such switching costs the tighter is customer lock-in;
— **complementarities** are determined by the extent of completeness of fulfilling customer needs by the firm and its business partners;
— **efficiency** pertains to the benefits that customers can reap from savings in time, effort and financial costs that are brought about by the firm's offer.

There were so far only a few attempts to test the Amit and Zott's framework empirically with a quantitative approach, though the outcomes were rather inconclusive and context sensitive. Christensen and Methlie (2003) having researched implementations of e-business solutions in traditional companies noted no significant improvement in financial performance, which was attributed to the early stage of the implementation and the lack of time for the positive effects to manifest. According to the later research by Amit and Zott (2007), Novelty positively influenced financial performance while Efficiency did so only during a period of resource scarcity. In another paper, the same authors studied how the fit between Novelty- and Efficiency-centred business models with different product market strategies can enhance firm performance (Amit, Zott, 2007). Using a heterogeneous population of companies (including both internet-enabled and traditional businesses), Malone et al. found that some models perform financially better than others (2005).

In light of the above, it seems that the concept of the value creation model in e-business has considerable practical merit it could be proposed that **"the increased involvement of a company in any of the four value drivers results in its improved financial performance".** To test this hypothesis, it was necessary to develop adequate measures of the elements of the value creation model and competitive performance, which will be discussed in the next section.

2. Research methodology

The data on characteristics of business models employed by internet companies were collected through a CATI survey in August 2012. The interviewed respondents were managers of Polish firms that were utilizing Internet as a distribution channel for retailing and services with the exception of major Internet portals, advertising and web design agencies, media brokers, telecommunications companies, banks, insurers and operators of large popular news and lifestyle portals. The exclusion was made on the assumption that these companies employed so specific and diverse value creation mechanisms that making meaningful comparisons among them might be questionable based on survey data. The net sample of 150 observations was drawn at random from a database of major internet companies compiled by the authors of the study from several available rankings and listings of various types of internet businesses operating in Poland. The final set of studied companies was made

up in 57% of retailers and 43% of service providers, with 63% of them having sales of tangible products as the main revenue stream, 17.3% generating most incomes from sales of virtual products, and 16% relying above all on proceeds from advertising. Around 25% of businesses generated more than half of their sales outside of the internet.

Being multidimensional and difficult for direct measuring, the four sources of value in the model could be thought of as constructs or latent variables and evaluated accordingly by means of a multi-item Likert scale. Building on existing works in management science, both conceptual and empirical, and drawing from their own experience, the authors came up with 24 statements that were listed in Table 1.

Table 1. List of statements of the 7-point Likert scale used for measuring the four sources of value creation

Value creation source: Novelty
Only a few firms offer solutions similar to ours
In markets we operate in, we are recognized as pioneers
By offering our solutions we shape needs and/or behaviors of customers
Most of the time customers choose our solutions for the sake of their innovativeness
Our solutions have been imitated by competitors
Our key business partners do not cooperate with our competitors
Value creation source: Lock-in
Resigning from our offer and changing to our competitors' brings about high switching costs to our customers, such as extra time, effort and financial expenses
It happens that customers are not fully satisfied with our offer but they stay with us due to switching costs
We provide our customers with personalized solutions
Most of our customers make use of our personalized solutions
We consider it important to maintain for as long as possible even those customers who are less profitable
Regular customers are rewarded through loyalty programs and other measures
We have implemented specific mechanisms for maintaining customers
Our key partners have strong impact on uniqueness of our offer for customers
An important criterion of selecting our business partners is enhancing our capacity for maintaining customers

Value creation source: Complementarities
Our offer is among the most comprehensive in the industry
Our firm has been systematically widening the extent of customer needs that we are able to satisfy
Our key partners have strong influence on how comprehensive our offer is
Our customers are choosing our offer for the attractiveness of the available complementary products
Customers try to use our solutions jointly to benefit from synergy effects
Value creation source: Efficiency
Our solutions allow customers to take advantage of savings in time and effort
Because of our solutions customers can solve their problems more easily
Internet grants customers more efficient access and use of our products than traditional channels
Our partners have significant contribution to savings in time and effort afforded customers by our offer

The original set of 24 individual variables was reduced with principal component analysis to a more manageable set of 8 composite variables representing various dimensions of the four theoretical constructs. The factor analysis also solved the problem of multicollinearity among variables, which tends to inflate standard errors in modeling. The 8 components were then used as independent variables in regression modeling. Using factor loadings on individual variables for interpretation, the following components were isolated: (1) Novelty: customer perspective, (2) Novelty: competitor and business partner perspective, (3) Lock-in: personalization, (4) Lock-in: exit barriers, (5) Lock-in: loyalty programs, (6) Lock-in: cooperation with business partners, (7) Complementarities, (8) Efficiency.

As can be seen, the constructs Complementarities and Efficiency were represented by a single component variable each, while the construct Novelty had two independent dimensions. The most complex in structure was Lock-in, which was composed of four apparently independent aspects. The components extracted with the exploratory factor analysis allowed to retain approximately 60% of the original variance, which permits treating them as an adequate representation of their source measurable variables.

In the study, financial performance was defined as the ratio of operational return on sales obtained by dividing operational income from transactions on the

internet by sales achieved on the internet. To increase item response rate from survey participants, the variable did not have an open-ended format but was categorized with four predetermined answer options. To be usable in binary logistic regression the variable was later dichotomized with a value of 0 denoting firms with operational returns on sales no greater than 20% (67.7% of the sample) and a value of 1 indicating the companies that had the ratio of more than 20% (33.3% of the sample). The split point of 20% was chosen to yield two groups with closely comparable sizes – it transpired that any other merger of categories in the original variable would result in more disproportionate subgroups.

To obtain the model with the best fit to the empirical data and the optimal prognostic capabilities, it was decided to use binary logistic regression with backward elimination of predictors to exercise more control over the suppressor effect. The original set of independent variables included 8 components representing various aspects of value creation model supplemented with several terms pertaining to different characteristics of the firms such as the number of employees, percentage of sales from transactions on the internet, percentage of loyal customers, year of funding and year of starting operations on the internet.

3. Research results

The backward regression procedure finished at the 9th step, after eliminating 8 statistically insignificant candidates for predictors, resulting in a model with the following goodness-of-fit and pseudo R-Square measures (Table 2.).

Table 2. Goodness-of-fit measures for the outcome logistic regression model

Step	Chi-square	Sig.	–2 log-likelihood	Nagelkerke R Square
9	45.735	<0.001	145.219	.365

The overall model provides statistically significant improvement in predicting group membership of the companies (i.e. low versus high sales profitability) with an error reduction of around 36.5% in comparison to the baseline solution containing only a fixed term and no independent variables. The classification table (Table 3) contains a comparison of groupings of firms using the regression equation and the baseline setting when all observations were assigned to the more numerous category of the dependent variable.

The classification table indicates that predicting group membership of companies with the logistic regression model results in 75.3% of correctly classified cases compared to 66.7% of rightly predicted memberships when all firms were considered to be low profitability (0). Thus, the model offers a considerable improvement in predicting capacity over the baseline scenario and could be potentially useful for

practical applications. The variables included in the model and their coefficients are shown in Table 4.

Table 3. Outcomes of the classification of the participant firms into groups with low and high profitability using the regression model and the baseline knowledge of the dependent variable distribution

Observed			Expected		
			Operational ROS > 20%		Percentage Correct
			0	1	
Baseline classification	Operational ROS > 20%	0	100	0	100.0
		1	50	0	0.0
	Overall Percentage				66.7
Classification with the final model	Operational ROS > 20%	0	86	14	86.0
		1	23	27	54.0
	Overall Percentage				75.3

Table 4. Variables included in the final iteration of the logistic regression model, their coefficients and individual tests of significance

Predictors	B	Standard Error	Wald	df	Sig.	Exp(B)
Complementarities	603	.284	4.521	1	.033	1.828
Percentage of total revenue from internet transactions	600	.263	5.222	1	.022	1.823
Number of employees	940	.188	24.908	1	.000	2.559
Efficiency	–636	.299	4.540	1	.033	.529
Constant	–5.229	1.212	18.611	1	.000	.005

The final regression equation contains 4 statistically significant predictor variables. Interestingly, out of 8 different aspects of the value creation model only 2 display sufficiently strong associations with financial performance to be used along other variables in the regression function. Quite unexpectedly, the Efficiency variable remains in a negative relationship with financial performance with higher scores on Efficiency lowering odds of a company falling into the higher profitability category by a factor of 0.529. Other variables with higher values tend to increase the odds of a firm being classified as highly profitable. The strongest factor here is the number

of employees, which, with each subsequent category on the scale, increases the odds by more than twofold (2.559). Involvement in Complementarities and Percentage of Total Revenues from Internet Transactions seem to be equally important in enhancing profitability with similar impacts on odds ratio of 1.8 for a one-unit increase on their respective scales, other factors remaining constant.

The above findings seem to give only limited support to the hypothesis of the study, as only one of the four drivers comprising the Amit and Zott's value creation framework in e-business (Complementarities) seems to be positively associated with financial performance of the surveyed companies, while another driver (Efficiency) exhibits what appears to be an inverse relationship.

4. Discussion

The omission from the regression analysis of the two variables (Novelty and Lock-in) representing important aspects of e-business value creation model may suggest that these concepts have only limited potential as a conceptual lens through which to explain the success and failure of business models. However, one relevant caveat here could be the idiosyncratic features of the studied internet companies, which despite being representative for Poland, included almost exclusively e-retailers and providers of rather uncomplicated services. It may well turn out that explanatory power of the value creation framework could be greater if employed in analysis of more complex business models, like those represented by the companies removed from the sample.

The fact that Efficiency was negatively related to operational ROS does not have to imply causal association. And even if a cause-and-effect link did exist, it was possible to explain in at least two plausible ways.

Firstly, the companies whose offerings allowed the consumers to solve their problems quickly, possibly also cheaply and reliably. In consequence, they had to accept lower sales profitability. Such a situation didn't have to entail weaker financial results and worse market position as only one metric was used to evaluate financial outcomes of involvement in e-business, which is an apparent limitation of the study. It can be easily conceived that a lower ROS ratio could be compensated by a higher volume of sales to achieve higher profitability of a company (revealed by other metrics such as ROA or ROE, not looked at in this study).

Another explanation could lie in a very intense competitive rivalry within the industries in which some of the studied companies had to operate. In such conditions advanced and comprehensive solutions increasing efficiency for customers could be forced upon a firm by strong pressure from rivals, and as such could be a necessary measure to remain in the market rather than a source of competitive advantage leading to increased mark-ups and profits. Unfortunately, the data collected in the survey was not sufficient to assess the intensity of competitive struggle in each firm's market environment. As such, the model could not be adjusted by that factor.

The substantial positive effect of Complementarities on financial performance could be linked to economies of scope which result in a lower cost structure and higher unit profitability due to offering a wide range of products addressing a group of related needs. The other partial explanation could be offered by considerable costs of customer acquisition in internet channels.

Among all significant predictors the strongest was the company size as measured by the number of employees with larger firms tending to display higher levels of profitability. It may imply that certain economy of scale mechanisms could be responsible but the fact that the studied businesses operated in various markets, compounded by the lack of knowledge about their pertinent characteristics, makes such a conclusion debatable.

It seems interesting to set the outcomes of this research against our previous study concerning the relationship between value proposition and firm performance (Doligalski, Zaborek, Sysko-Romańczuk, 2015). Based on the same sample of 150 Polish Internet companies, we distinguished 5 segments of online businesses. Despite different characteristics the identified segments did not show statistically significant differences in sales profit margins. The basis for segmentation were strategies of creating online value proposition (Doligalski, 2010), which constitute a narrower concept than the business model. The outcomes of these two studies may suggest that profitability sources of online companies are specific to individual companies, rather than shared across whole segments or industries. And as such, attempts at finding common profitability drivers may have limited success.

On the other hand, the difficulty in measuring financial impacts of e-business may explain why some papers link value creation to some non-financial metrics (e.g., e-business implementation in Rapp, Rapp, Schillewaert, 2008; procurement in Soto-Acosta, Meroño-Cerdan, 2008).

In summary of the discussion, it is worthwhile to highlight the notable contributions of this research. To the authors' best knowledge, it was the first quantitative analysis of business models of the Polish internet companies. In terms of the substantive outcomes, the study underscores the complexity and ambiguity of drivers of value in internet business, suggesting that highly competitive and volatile markets can render standard and formulaic approaches ineffective in favor of more creative and original solutions, uniquely deployed by the most successful companies.

5. Limitations and further research directions

As it was already indicated, the study has several major constraints and limitations. To begin with, the sample of companies comprised only firms using relatively simple business models in retailing and providing other non-complicated services; hence, the outcomes could be different if more sophisticated companies were investigated. On the other hand, such research of less uniform groups of businesses should probably involve a case study approach and not a quantitative survey, due to likely

difficulty in designing a survey questionnaire relevant for the whole sample of firms (greater complexity also implies lower comparability).

Another limitation pertains to only one metric of performance used in this study (profitability ratio). It can be argued that the links between aspects of the value creation model and performance could be different if other metrics were employed. For example, the use of ROA or ROE coefficients would be a more appropriate choice for those firms that use low mark-ups and high turnovers to derive their profits.

Lastly, the focus on only Polish companies, who mostly cater to Polish customers, could be considered a constraining factor. However, there are no viable reasons to believe that comparable firms operating in other national markets (e.g. Western Europe) should show markedly different patterns in how value for customers is being created – after all the internet environment is characterized by quick replication of successful business models.

Further research in this area could be oriented on overcoming the limitations of the current study. As such, it would be interesting to see a similar project replicated in a different country, encompassing more diversified companies in terms of business models, and with a wider selection of performance metrics, both operational and financial. Also, useful insights could be derived from a multiple case study project mapping out actual cause-and-effect mechanisms leading from assorted value drivers to changes in operational and financial efficiency.

In addition, in the context of further studies, there are several research questions that we find especially interesting to answer. Is there a meaningful difference in value creation on the Internet between online pure players and brick-and-click companies? How the two types of firms compare in their state of implementation of the Amit and Zott's four sources of value creation? Do traditional companies simply recreate their offline strategies in the online environment without major adaptations to their logic and dynamics? What is more important to online companies: offering richer customer experiences or greater automation of customer service leading to higher efficiency? And finally, how the level of customer efficiency interacts with novelty? In other words, does focusing on developing higher customer efficiency can make companies less innovative?

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KREACJA WARTOŚCI W E-BIZNESIE JAKO DETERMINANTA WYNIKÓW FINANSOWYCH: BADANIE MODELI BIZNESU POLSKICH FIRM INTERNETOWYCH

Streszczenie

Artykuł prezentuje wyniki badań przeprowadzonych wśród menedżerów polskich firm internetowych. Celem badań było ustalenie zależności między sposobami kreacji wartości w e-biznesie a poziomem rentowości firm. Podstawę teoretyczną badań stanowił model kreacji wartości w e-biznesie autorstwa Amita i Zotta. Badania objęły 150 firm należących do grupy największych internetowych sprzedawców i dostawców e-usług. W celu ustalenia statystycznie istotnych predyktorów współczynnika zysku operacyjnego do sprzedaży wykorzystano regresję logistyczną. Z badań wynika, że z czterech elementów tworzących

model Amita i Zotta jedynie komplementarność była blisko powiązana z poprawą wyników finansowych. Kolejne dwa elementy – uwięzienie klienta i nowatorstwo – nie miały mocy predykcyjnej, natomiast czwarty element (efektywność klienta) był ujemnie skorelowany z wynikiem finansowym.

Słowa kluczowe: model biznesu, kreacja wartości, e-biznes, e-commerce, Internet.