

SUCCESS FACTORS OF CLOUD BUSINESS MODELS

Complete Research

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Abstract

The acceleration of the technical change in the fast moving electronic market increases the uncertainty and risk of IT providers. This development seeks for stable guidelines and success factors for new and existing business models. Within our research, we conducted an intensive analysis of 45 providers on the cloud market regarding success-driving factors. We systemized their business models with the help of a cloud business model framework and analyzed them statistically. We revealed 39 success-driving business model characteristics that emphasize product related success factors, a high vertical integration as well as the charging and costs dimension. Finally, we discussed the prediction for success of cloud business models. Until now, experienced market players have the most successful business models, while newcomers have difficulties to compete.

Keywords: Cloud computing, business model, success factors, success indicators, qualitative content analysis.

1 Introduction

Since the beginning of the new digital economy (Cohen *et al.*, 2000; Gordon, 2000) in the late 90s, the business model concept became more significant, not only in practice but also in academic research (see e.g. the temporal distribution of publications for the search item “business model” in the AIS electronic library). The drivers of this development are firstly the increased performance of the information and communication technology (ICT) (Cohen *et al.*, 2000; Gordon, 2000), especially regarding the data processing and the data transmission (Staehler, 2002). Second, the internet as enabler for interactivity, ubiquity, multimediality, and distribution penetrates the economy and society faster than other mass media (Cohen *et al.*, 2000; Zerdick *et al.*, 2001).

The business model concept arises as an analysis unit that takes the new conditions into account (Staehler, 2002). The objective of a business model is to set a foundation for the following issues: understanding the appreciation of an existing business; recognizing own weaknesses to achieve the improvement of the business; and systematically evaluating new business ideas with their competitive advantages and success probabilities (Staehler, 2002). The most definitions use a component-based approach that abstracts the description of a business – of “what a company is doing in order to create and commercialize value” (Burkhart *et al.*, 2011) (see also (Osterwalder *et al.*, 2010; Wirtz, 2010)).

Although a high number of academics analyze this concept, a common definition of the business model term is missing until now (Zott *et al.*, 2011; Lambert and Davidson, 2013).

With the acceleration of the technical change in the ICT and the diffusion of ICT products, there grow uncertainty and risks with new business models. Forecasts or long-term technology plans are limited, thus investments are fraught with higher risks (Bettis and Hitt, 1995). An very actual hype wave and representative example of these fast developing business models, is the cloud computing focus (Gartner, 2013). With this business concept, providers offer freely scalable IT resources (e.g. servers, storage, applications, or network resources) in an on-demand manner via networks (intranet or internet) and receive usage-based revenue streams (Mell and Grance, 2009; Weinhardt *et al.*, 2009). With its high standardization and hierarchical structure, cloud services are able to build on one another. This induces the diversity and complexity of the cloud market and seeks for a reliable prediction for success.

Within our actual research, we used the business model concept as analysis unit for the analysis of success-driving factors and referred to a structured and detailed cloud business model framework from our previous research (Labes *et al.*, 2013). We addressed the given need with the following research questions:

1. What business model characteristics drive the success of cloud firms?
2. How do the success-related characteristics operationalize given success factors from the literature?

Answering the questions, we analyzed the related work of success factors for business models. Then, we conducted a comprehensive study of 45 cloud firms to analyze their business models regarding success-driving characteristics. We discussed the literature-based success factors regarding the revealed successful characteristics and concluded with advices for the development of a cloud business and the prediction of success.

2 Related Work

Success factors are defined as “the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization” (Rockart, 1979). The research on success factors is traceable to the 60s but the distinct research on successful business models is rare. An important research that focuses on success factors is the PIMS (Profit Impact of Marketing Strategies) study. Within this study, Schoeffler (1974) analyzed business data from 3000 business units (450 member companies of the strategic planning institute (SPI), all branches, average values over many years) and derived seven strategic factors that drive success. In 1979, Rockart mentioned critical success factors for businesses the first time (Rockart, 1979) and conducted interviews with CEOs to detect reliable factors for their corporate success (Rockart, 1982). Further, Peters and Waterman (1982) analyzed 43 of Fortune 500's top performing companies and derived eight themes that are essential for successful firms. Leidecker and Bruno (1984) proposed three levels of a critical success factor analysis with eight identification techniques. They applied those techniques and revealed success factors for specific industries as well as for different companies. Brentani (1991) analyzed generic success factors for new business services, as we can consider cloud services today.

Besides the general success factor research, some authors specifically focus on the cloud business. A survey among CIOs revealed general success factors of cloud services (CIO, 2008). Horsti *et al.* (2004) conducted a case study research and differentiated critical success factors and customer need factors for different maturity stages of an electronic business. A few authors developed success factors of the SaaS business, e.g. Ernst and Rothlauf (2012) revealed seven critical success factors from a literature-based argumentative study. Also Walther *et al.* (2012) conducted a literature-based research and derived 12 success factors for SaaS. The derived factors of both publications describe very fundamental aspects that should be basic for other service models like PaaS and IaaS as well (CIO, 2008).

We find many overlaps between the mentioned success factors in the general and the cloud specific literature (see Table 1). This induces the assumption that some generic success factors are valid even

for cloud businesses but need specific supplements. To clarify and operationalize these demands, we will compare the success factors with our analysis results.

No.	Critical success factors	Generic focus					Specific electronic or cloud business focus			
		(Schoeffler et al., 1974)	(Rockart, 1982)	(Peters and Waterman, 1982)	(Leidecker and Bruno, 1984)	(Brentani, 1991)	(CIO, 2008)	(Horsti et al., 2004)	(Ernst and Rothlauf, 2012)	(Walther et al., 2012)
1	Product portfolio / quality	x	x		x	x	x	x	x	x
2	Employees / productivity	x	x	x	x			x	x	
3	Innovation / differentiation	x		x	x	x		x	x	x
4	Availability / reliable infrastructure						x	x		x
5	Communication / SLA / image		x		x			x	x	
6	Customer interaction / care / customness			x	x	x	x	x		
7	Knowhow / technology skills			x	x	x		x	x	
8	Vertical integration (universal or lean)	x		x				x		
9	Partner network				x			x	x	
10	Flexibility / reversion						x			x
11	Interoperability / implementation						x			x
12	Security / privacy / data control						x			x
13	Charging / cost savings / synergies				x	x	x			x
14	Flexible governance		x	x						
15	Investment intensity / capital	x			x				x	
16	Active decision making / management commitment		x	x		x				
17	Market position / growth / competitiveness	x				x				
18	Market attractiveness / segment adjustment					x				

Table 1. Critical success factors for general and cloud businesses

3 Research Approach

Within our research, we used a positivistic approach (Myers, 1997) to exploratory increase the understanding and predicting of the business success. Osterwalder (2004) created a business model ontology that helps structuring a business model but it “is not a guarantee for success as it has to be implemented and managed”. Veit et al. (2014) confirmed this with their research agenda for business models that emphasized the IT support for the successful development of a business models. We followed this idea and conducted an intensive study of 45 cloud providers and their business models.

We followed a mixed method approach and developed a strategy regarding a research design and data analysis for a comprehensive developmental purpose (Venkatesh et al., 2013). The mixed method is a qualitative content analysis with an inductive formation of categories and data followed by a statistical evaluation of the data (Mayring, 2004).

Within the data generation part, we based our investigations on the existing cloud business model framework (see Figure 1) from previous research (Labes et al., 2013). It is classified as a morphological box where the categories represent the basic components of a business model, as they are introduced earlier. The sub-categories and design features are the result of various discussions and workshops with academic cloud experts and related IT service providers. The design features in the morphological box show the possible options to “assemble” a business model. This framework includes 105 characteristics that are important for an implementation purpose and are potentially success-related (Osterwalder, 2004). The characteristics are not exclusively in one sub-category, there are various characteristics possible in parallel.

We used this framework to analyze the business models of 45 cloud providers or its separated cloud division in case of a wider product portfolio. In doing so, we comprehensively reviewed the company’s websites, encyclopedia items, blogs, and news feeds to obtain the empirical data. Two researchers reviewed the information in three cycles from January to July 2014 and filled the information in a ta-

ble aligned with the characteristics to produce a detailed profile for each cloud business model. Some characteristics, i.e. the partner payment model, are not comprehensively observable in the search process, which are compensated with estimations.

To enable comparable results, we converted the collected material into measurable data by rating the business model characteristics regarding their implementation in the business model (0 = “not represented”, 1 = “represented”, 2 = “strongly represented”). We continuously discussed and reviewed the assessments with each other to verify the coding consistency (Thomas, 2006). The final summarizing table containing “0”s, “1”s, and “2”s (105 x 45 data size) is the basis for the statistical analysis.

Within the data analysis part, we derived concrete characteristics of a business model that drive the success of a firm. To identify these critical business model characteristics we analyzed correlations between the business model characteristics and indicators for success. Then, we discussed the revealed success-correlated business model features regarding the given success factors from the literature. The results can give evidence for the existing success factors and reveal new insights for successful cloud business models. Finally, we can give recommendations for action regarding successful business models in the cloud market.

Category		Sub-Category		Design Feature										
Business Strategy	Market strategy		Market adaption			Market design			Market diffusion			Market co-construction		
	Market entry		New in market			Market expansion			Knowhow transfer					
	Diversification		Horizontal diversification			Vertical diversification			Lateral diversification					
Value Proposition	Core product („as a Service“)		Storage service	Computing service	Network service	Development environment	Development tool	Software service	Business process					
	Product system		Database service	Search service	Billing service	Messaging service	Data processing	Administration	Market place					
	Product system width		Manifold width				Limited width							
	Product system depth		Manifold depth				Limited depth							
	Additional services		Integration service			Consulting service		Human resource		Individual Support				
	Provisioning model		Private cloud			Community cloud		Hybrid cloud		Public cloud				
	Emotional cust. experience		Consolidation	Structuring	Standardization	Flexibility	Scalability	Cost savings	Time savings	Sustainability	Customization	Security		
Value Creation	Partner Network		Cooperation intensity			Ecosystem		Strategic alliance		Loose cooperation		Purchase		
	Partner type		Technology partners			Business partners			Consulting partners					
	Business field		Complementary field			Similar field			Substitutive field					
	Resources & Activities	Resources		Hardware resource	Software resource	Network resource	Data / content	Knowhow resource	Human resource					
		Activities		Production activities	Aggregation activities	Aggregation with Add-on	Comparison & Categorization	Integration activities	Consulting activities					
	Costs		Primary costs		Initial costs		Fix operational costs		Variable operational Costs					
Value Delivery	Target Market		Market focus			Mass market			Branch market		Niche market			
	Customer focus		Major enterprises		SME		Start-ups		Public sector		Consumer			
	Distribution & Customer Relationship		Communication channel			Internet connection		Telephone line		Print media		Personal interaction		
	Distribution channel		Web interface			Mobile interface			On-site interaction					
	Customer relationship		Self service		Online profile		Community		Support		Monitoring		Transparent SLA	
	Revenue		Primary revenue			Main service			Supplementary service					
	Partner payment		One-time charge		Subscription		Reservation		Pay-per-Use		Spot		Free	
Partner payment		Sponsoring		Advertising		Commission		Share of turnover		Membership				

Figure 1. Cloud business model framework (Labes et al., 2013)

4 Analysis of Business Model Characteristics

4.1 Companies

Due to the huge variety of providers in the cloud computing market, we decided to use a structured process to select valuable cloud service providers. First, we determined worldwide cloud provider rankings, based on an internet search. We found 27 rankings from independent research companies, practitioner journals or cloud marketplaces, like e.g. Cloud Reviews, Gartner, Forrester, or BTC Logic. To increase the objectivity and credibility, we considered all businesses that are mentioned by at least two rankings and selected 45 well-known cloud business providers for the analysis (see Figure 2). The variety within the selected providers is large. There are experienced companies like IBM and HP, newer big players like AT&T, Microsoft, Amazon and Google and smaller providers with a smaller turnover like Citrix or RedHat. Since very recently, many very small storage and synchronization providers like JustCloud or SugarSync have appeared in the cloud market.

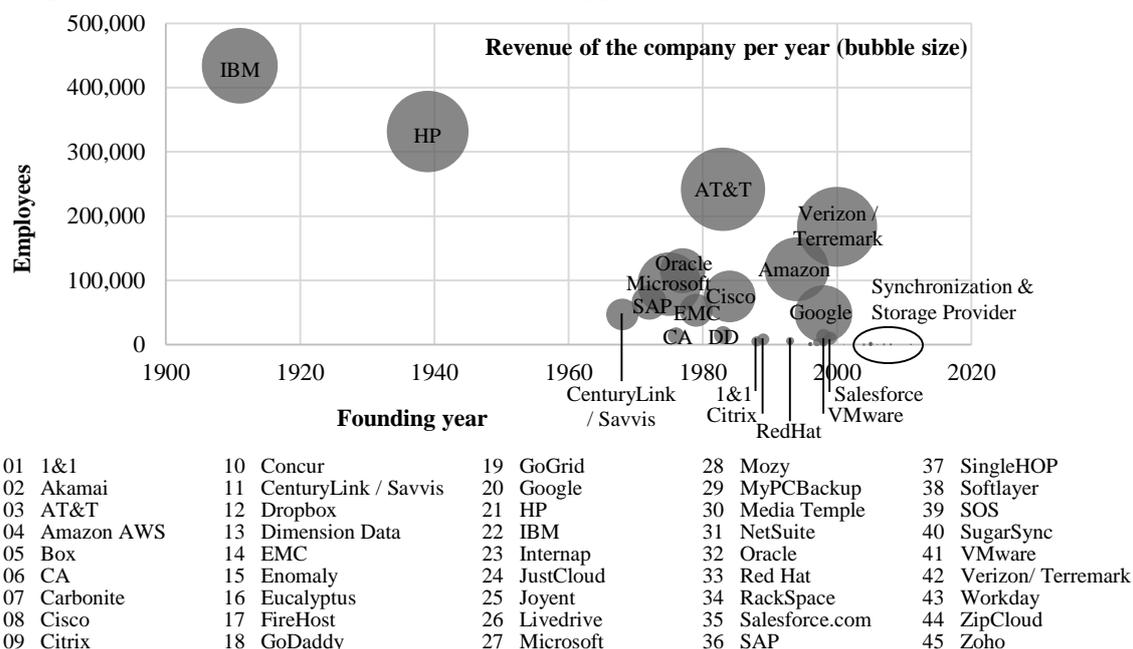


Figure 2. Selected cloud computing companies

4.2 Indicators for Success

Determining the success factors, we used the key indicator system, proposed by Rockart (1979) as the “best” approach. State of the art research provides the return on investment (ROI) as common indicator for successful business models (e.g. (Schoeffler *et al.*, 1974)). Due to the limited accessibility of financial data for cloud businesses, we calculated the EBIT margin for cloud firms or in case of larger companies for the segment, the cloud business is dedicated to. Additionally, we complement the findings with another metric because financial data are not the only and best indicator for business performance (Eccles, 1991). Furthermore, the EBIT margin is treating young and fast growing firms unequal because their investments in growth commonly exceed their revenues thus returning a negative EBIT margin. Hence, we used a second indicator as researchers state that there is a relation between the firm’s web visibility and its business performance (Wang and Vaughan, 2014; Vaughan, 2004). As Wang and Vaughan (2014) revealed, there can be a significant correlation between the number of inlinks (web visibility) to a company website and the business performance. We argue that this is a suitable indicator for internet driven businesses like in cloud computing. To measure the inlink count, we used alexa.com as the web data base, following the approach of Vaughan and Yang (2012).

4.3 Analysis Result

Our correlation analysis is based on the spearman’s rank correlation coefficient. First, we proved our assumption above and analyzed the correlation between the indicators and the age of the cloud company (see Table 2). We can see that the EBIT margin has a significant negative correlation to companies with a higher year of foundation, which confirm that younger companies have a smaller EBIT margin than older companies do. In contrast, the web visibility has no correlation and seems to be a stable and independent indicator that treats all companies equally.

	ρ EBIT margin	ρ Web visibility
Year of company foundation	-0,446 **	-0,046

* = $p < 0.05$ (two-tailed test), ** = $p < 0.025$ (two-tailed test), *** = $p < 0.01$ (two-tailed test)

Table 2. Correlation between the year of foundation and the indicators

Further, we identified the most influencing business model characteristics (BMC). The correlation between the EBIT margin and the BMC shows 34 characteristics that are positively correlated and have a p-value less than 5% and can be seen as significant. Regarding the other indicator, the web visibility, 18 characteristics show a significant positive correlation. From these BMC, seven characteristics correlate significantly with both indicators. For the following argumentation, we used those BMC that have a significant positive correlation to at least one indicator and correlate positively with the other one. In case of a significant correlation with the web visibility, we also accepted a small negative correlation with the EBIT margin, to strengthen the disadvantaged young and small cloud providers. Finally, 39 characteristics remained as critical for the success of the business model (see Table 3).

No.	BMC	ρ EBIT margin	ρ Web visibility	No.	BMC	ρ EBIT margin	ρ Web visibility
1	Manifold width	0,68 ***	0,45 ***	21	Hardware resource	0,38 **	0,10
2	One-time charge	0,53 ***	0,11	22	Private cloud	0,37 **	0,15
3	Database service	0,51 ***	0,25	23	Market expansion	0,37 **	0,33 *
4	Monitoring	0,51 ***	0,19	24	Integration activities	0,36 **	0,08
5	Consolidation	0,51 ***	0,15	25	Supplementary service	0,35 **	0,30 *
6	Print media	0,50 ***	0,20	26	Fix operational costs	0,34 **	0,20
7	Knowhow transfer	0,49 ***	0,32 *	27	Integration service	0,33 *	0,14
8	Administration	0,49 ***	0,21	28	Branch market	0,33 *	0,04
9	Knowhow resource	0,49 ***	0,27	29	Production activities	0,32 *	0,12
10	Consulting activities	0,46 ***	0,05	30	Computing service	0,30 *	0,10
11	Hybrid cloud	0,46 ***	0,01	31	Community	0,29	0,56 ***
12	Manifold depth	0,45 ***	0,13	32	Individual support	0,27	0,39 ***
13	Consulting service	0,45 ***	0,13	33	Messaging service	0,25	0,48 ***
14	Similar field	0,43 ***	0,29	34	Development tool	0,23	0,33 *
15	Human resource	0,43 ***	0,34 **	35	Billing service	0,21	0,33 **
16	Pay-per-use	0,41 ***	0,04	36	Membership	0,18	0,30 *
17	Network resource	0,40 ***	0,08	37	Cost savings	0,17	0,37 **
18	On-site interaction	0,39 ***	0,11	38	SME	0,03	0,37 **
19	Vertical diversification	0,38 ***	0,32 *	39	Market design	-0,05	0,36 **
20	Development environment	0,38 **	0,31 *				

* = $p < 0.05$ (two-tailed test), ** = $p < 0.025$ (two-tailed test), *** = $p < 0.01$ (two-tailed test)

Table 3. Critical success related business model characteristics

If we look at the results, the identified critical BMC describe experienced market players who expand their existing business with a cloud division and act as a universal provider. Our indicators for success seem to prefer big firms to small newcomers in the cloud market. Therefore, the mentioned successful characteristics of a cloud business model are only indicators for success and do not allow a reverse conclusion that not success-related BMC are not relevant for a successful business model.

Some expected features show no significant correlation because they are basic features that must be established by each cloud firm. That means characteristics that have a high adoption rate but show no correlation. For example, ‘Web interface’ and ‘Internet connection’ are represented very strongly (average rating >1.9, “strongly represented”) within 100% of the business models. Furthermore, the BMC ‘Security’, ‘Scalability’, and ‘Support’ are implemented by each firm (100%) and have an above-average rating (>1.0) but do not correlate significantly or even negatively. These mentioned BMC are obviously relevant for a cloud business model but cannot serve as unique differentiating characteristic for success.

Some other characteristics that strongly correlate with the indicators describe rather traditional aspects (e.g. ‘Print media’, ‘On-site interaction’ and ‘one-time charge’). This can induce that especially traditional methods strengthen the trust in new and unstable environments like the cloud market and therefore lead to success.

To provide a cross-check, we conducted a second analysis. Based on our results we quantified the number of implemented critical BMC in our sample and called this metric ‘mean adoption of critical BMC’. We analyzed the correlative context to the indicators and compared the results with the non-critical BMC (see Table 4). The results show the proof that the mean adoption of the critical BMC strongly and significantly correlates to the indicators for success.

	ρ EBIT margin	ρ Web visibility
Mean adoption of critical BMC	0,634 ***	0,440 ***
Mean adoption of non-critical BMC	-0,035	0,084

* = $p < 0.05$ (two-tailed test), ** = $p < 0.025$ (two-tailed test), *** = $p < 0.01$ (two-tailed test)

Table 4. Correlation between the BMC and the indicators

Further, we see evidence that the diversity between business models regarding the critical BMC is more significant than between the noncritical BMC (see Figure 3). As the figure shows, the mean adoption of both, critical and non-critical BMC is about the same. Yet the adoption of the critical BMC is distributed with a high dispersion whereas the non-critical BMC do not differ much in our sample. That indicates that the implementation of all critical BMC have a higher influence on the firm’s success while the non-critical BMC have only marginal effects.

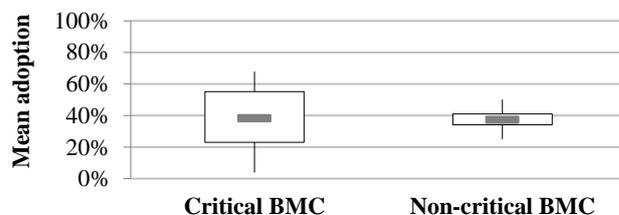


Figure 3. Diversity of the critical and non-critical BMC

5 Success Factors and Business Model Characteristics

At the beginning of our research, we summarized success factors of business models for general and cloud purpose. Our research can now give concrete implementation guidelines for the success factors. We compared the literature-based cloud success factors with the BMC and intensively discussed the implementation possibilities.

1. Product portfolio / quality: An attractive product portfolio and product performance have a significant influence to the business success (Ernst and Rothlauf, 2012). Providers with a better quality obtain higher prices and strengthen the customer loyalty to increase the business success. The analysis results address only the product portfolio and cover this success factor with BMC of the core product (‘Computing service’, ‘Development environment’ and ‘- tool’) and the product system (‘Database -’,

‘Messaging -’ and ‘Billing service’, as well as an ‘Administration’ possibility). Additional ‘services’ of ‘Integration’ and ‘Consulting’ are critical to success as well. Characteristics regarding the quality, like ‘Scalability’, ‘Flexibility’ or ‘Time savings’ do not significantly correlate to the indicators.

2. Employees / productivity: Most studies propose the employees and the productivity as a positive correlated factor for corporate success. Productivity is the added value per employee and can be optimized especially in the cloud business: On the one hand, the high standardization and automation allows a better relation of employees to infrastructure (Greenberg *et al.*, 2009). On the other hand, the improved resource utilization increases the output value (Loos *et al.*, 2011). The BMC cannot measure the productivity explicitly, only the characteristic ‘Human resource’ addresses this success factor.

3. Innovation / differentiation: The rate of new products and the differentiation to competitors is another factor that has a positive influence on the return on investment (ROI) (Schoeffler *et al.*, 1974). The high degree of standardization in cloud computing challenges the differentiation towards competitors and requires innovative ideas. The innovative role of a business model can be linked to success-related strategic BMC. Providers that aim at ‘Market design’ and enter the cloud market with ‘Market expansion’ from an established position have the best possibilities for success.

4. Availability / reliable infrastructure: The availability of an online service is the basic requirement for the customer’s acceptance. Only with the satisfying fulfillment, the market share of a cloud service can be increased. The successful BMC ‘Hardware -’ and ‘Network resource’ can realize its basis. Furthermore, the customer relationship characteristic ‘Monitoring’ promotes the transparency and reliability of a cloud service.

5. Communication / SLA / image: Another emphasized success factor is the communication to the customer and the customer satisfaction (Susarla and Barua, 2009). The outsourcing of a service and its data to a third party provider induces a high uncertainty and risk. The transported image as well as a customer-orientated communication and transparent service levels promote the trust of the customers and stimulate the distribution of the service. Within the BMC, only the communication characteristic ‘Print media’ correlates significantly with the indicators. Other expected BMC regarding the communication do not correlate strongly.

6. Customer interaction / care / customness: The deepened maintenance of the customer relationship is another success factor. Especially for new concepts like cloud services, many questions will arise that need to be discussed. To address this success factor, the analyzed business models offer characteristics like a ‘Community’ forum, ‘On-site interaction’ as distribution channel, and ‘Individual support’ services to maintain the customer relationship intensively.

7. Knowhow / technology skills: The company’s knowhow has a significant influence on the success (Ernst and Rothlauf, 2012) for each provider, but especially for consultants and integrators. Cloud consultants serve with overall knowhow about the cloud market to facilitate the market entry for other companies, whereas integrators have explicit knowhow in implementing a dedicated cloud service. ‘Knowhow’ is represented as a key resource in the framework and correlates with the indicators for success. Further, the ‘Knowhow transfer’ from former business or related business units has a beneficial influence for success within the cloud market.

8. Vertical integration: The vertical integration has a positive influence on the ROI, if the integration is very high (Schoeffler *et al.*, 1974; Buzzell, 2004) or very lean (Peters and Waterman, 1982). Because of the interoperability between cloud services, the levels of integration can easily be separated. Small cloud providers can have advantages with lean and simple cloud services (low integration) while big cloud providers probably benefit as a universal provider by offering the whole cloud portfolio. Success-related BMC of our analysis only focus on the universal cloud provider. Providers are successful with a ‘Vertical diversification’ by entering the cloud market and offering a product system with a ‘Manifold width’ and ‘- depth’. This aims at the customer value ‘Consolidation’ and emphasizes the in-house ‘Production -’ and ‘Consulting activities’.

9. Partner network: In contrast to the traditional business, the cloud business has a higher focus on partner networks. Because of the standardization of cloud services, the market pressure and lock-in effects are decreasing. However, the contract negotiations are a critical condition especially in the IT

business (Susarla and Barua, 2009). Besides the various integration possibilities, cooperation between SaaS providers and third party vendors can promote cost reductions (Ernst and Rothlauf, 2012), e.g. for the complex license management. Related BMC that drive the success are a 'Similar field' of the partners, 'Consulting services' via partners and the partner payment model 'Membership'.

10. Flexibility / reversion: This success factor refers to the organizational flexibility of a cloud service in the form of flexible booking options for the customers, e.g. the 'Pay-per-use' model. Besides the flexible integration, accounting and scaling, a cloud service should provide a flexible exit possibility, as it is allowed by a 'Hybrid cloud' model in combination with own infrastructure. The expected customer value 'Flexibility' shows no significant correlation.

11. Interoperability / implementation: Another success factor especially for cloud services is the technical flexibility of a cloud service. This means the technical interoperability to a legacy system, communicating IT systems or connected partner systems via standardized interfaces. There is only one BMC that can be related to this success factor, which is 'Integration activities'. Potential characteristics like the customer's experience of 'Standardization' do not strongly correlate with the success of the firm.

12. Security / privacy / data control: An important factor for the success of a cloud service is the security and data protection. The permanent exchange of personal data (also regarding the user behavior while using an online service) to a third party provider causes the compliance with high security requirements. The BMC for privacy-focused provisioning models, 'Private -' and 'Hybrid cloud', are correlated with the indicators for success. However, the user experience characteristic 'Security' directly addresses this factor but has a negative correlation with success.

13. Charging / cost savings: The revenue model of a cloud service is a success factor as well. 'Cost savings' are desired by the customer and should be provided as BMC by the cloud service. The primary costs of the cloud service production can serve as regulation screw, i.e. the success-related BMC 'Fix operational costs'. The customer payment BMC 'Pay-per-use' and 'One-time charge' correlate positively with the indicators. Besides the revenue focus of customers, also the partner payment model 'Membership' has a significant correlation. The main revenue from 'Supplementary services' can offer savings for the primary cloud service.

14. Flexible governance: This success factor describes a governance of a business model that is able to adjust and restructure the IS functions (Rockart, 1982) and deals with "loose-tight properties" (Peters and Waterman, 1982). The business model framework has no characteristics that cover and support this success factor; therefore, we have no correlations.

15. Investment intensity / capital: The availability of capital resources is relevant for high fixed and operating costs (Ernst and Rothlauf, 2012; Leidecker and Bruno, 1984). The PIMS-study confirmed that businesses with large market shares have above-average rates of investment turnover and working capital (Schoeffler *et al.*, 1974). The framework addresses this aspect with success-related business assets like 'Knowhow resource', 'Network resource', and 'Hardware resource'.

16. Active decision making / management commitment: Another factor regarding the management of a business model describes a philosophy that acts hands-on, shows its commitment, and drives quick decisions (Peters and Waterman, 1982). There is no doubt that this is an important aspect, but no characteristics of the framework describe this success factor. Management factors need to be addressed in parallel to the business model.

17. Market position / growth / competitiveness: The market share and growth is a major influence on the success of a firm and is influenced by the competitiveness of a company. Correlating characteristics like existing knowhow for a 'Knowhow transfer' and an active role in 'Market design' can strengthen this position.

18. Market attractiveness / segment adjustment: The determination of the target market is another success factor of a business model. Within the market focus, the 'Mass market' is assessed with the third highest rating of all characteristics and is implemented within 98% of the analyzed cloud business models. Therefore, this factor cannot serve as differentiating characteristic. The BMC 'Branch

market’ is correlated positively with the two indicators as well as the ‘SME’ customer focus. Further, the target market addresses other providers with ‘Membership’ services.

To give an overview at the mapping results, we show all relations between the BMC and the success factors (see Table 5). We can see an emphasis at the product related success factor, followed by a vertical integration as well as the charging and costs dimension. The success factors regarding an active and flexible management can find no equivalent within the business model characteristics and need to be arranged in parallel to the business model. The frequency distribution of the indication of success factors cannot be taken as an absolute assessment but gives advices for the significance, operationalization, and implementation of success factors within a cloud business model.

No.	Success Factors	Product portfolio / quality	Employees / productivity	Innovation / differentiation	Availability / reliable infrastructure	Communication / SLA / image	Customer interaction / care / customess	Knowhow / technology skills	Vertical integration (universal or lean)	Partner network	Flexibility / reversion	Interoperability / implementation	Security / privacy / data control	Charging / cost savings / synergies	Flexible governance	Investment intensity / capital	Active decision making / management commitment	Market position / growth / competitiveness	Market attractiveness / segment adjustment
1	Manifold width							x											
2	One-time charge												x						
3	Database service	x																	
4	Monitoring				x														
5	Consolidation							x											
6	Print media					x													
7	Knowhow transfer							x										x	
8	Administration	x																	
9	Knowhow resource							x								x			
10	Consulting activities								x										
11	Hybrid cloud									x		x							
12	Manifold depth								x										
13	Consulting service	x								x									
14	Similar field									x									
15	Human resource		x																
16	Pay-per-use										x		x						
17	Network resource				x											x			
18	On-site interaction						x												
19	Vertical diversification								x										
20	Development environment	x																	
21	Hardware resource				x											x			
22	Private cloud											x							
23	Market expansion			x														x	
24	Integration activities										x								
25	Supplementary service												x						
26	Fix operational costs												x						
27	Integration service	x								x									
28	Branch market																		x
29	Production activities								x										
30	Computing service	x																	
31	Community						x												
32	Individual support						x												
33	Messaging service	x																	
34	Development tool	x																	
35	Billing service	x																	
36	Membership									x			x						x
37	Cost savings												x						
38	SME																		x
39	Market design			x														x	
	Sum(x)	9	1	2	3	1	3	2	6	4	2	1	2	6	0	3	0	3	3

Table 5. Relations between the critical BMC and the success factors

6 Discussion of Successful Business Models

By creating a business model, the revealed critical BMC should be considered carefully in particular but the other factors should not be neglected in principle. Within an analysis of our firms regarding their mean adoption of critical BMC, we can see that firms with a higher EBIT margin and a higher web visibility have a higher adoption of critical BMC within their business models (see Figure 4). If we look at the firms in detail, it is significant, that the big firms have the highest implementation rate of the critical BMC for success. Microsoft meets 68% of the critical BMC, followed by Amazon’s AWS (65%), IBM (65%), CenturyLink / Savvis (64%), Cisco (64%), and VMware (64%). The small cloud synchronization firms have the lowest adoption of the critical BMC: SOS (4%), ZipCloud (5%), MyPCBackup (4%), JustCloud (4%), and Mozy (9%).

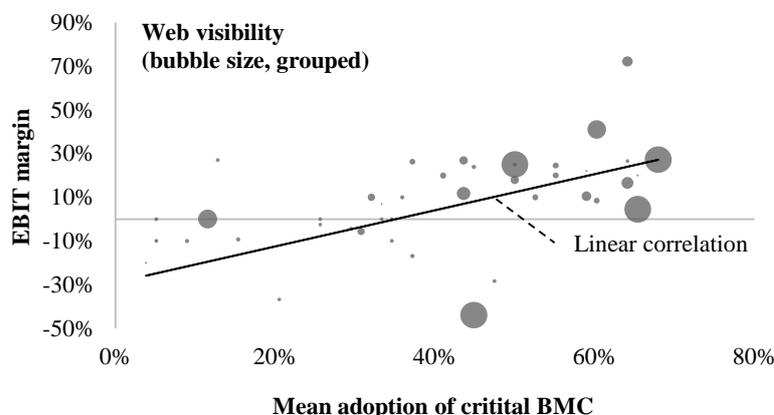


Figure 4. Correlation of the mean adoption of the critical BMC to the success indicators

To assess a cloud business model, we further can establish a useful connection to cloud business model clusters from our previous research (Labes et al., 2013). Within this research, we revealed four clusters of characteristics for types of cloud providers (see Figure 5, left) based on an examination with the same cloud business model framework. Now, we can analyze which clusters includes the most successful BMC and draw conclusions to the success of a business model type. We can see that the third cluster has the highest relative share of critical BMC, followed by the fourth. The newcomers are the smallest cluster and provide no characteristics that correlate with the indicators for success. The fourth cluster is the largest and provides the highest absolute number of critical BMC.

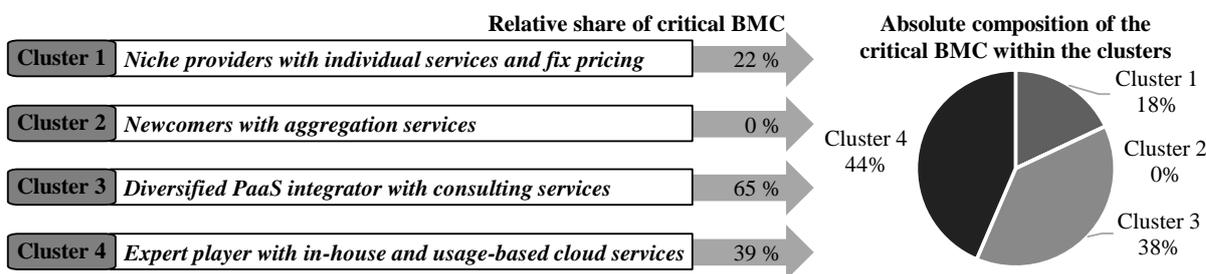


Figure 5. Composition of the critical BMC regarding the cloud provider types

We can conclude that the clusters 3 and 4 describe the most successful cloud provider types, whereas the third cluster has the most efficient ratio of success-related business model characteristics.

Until now, the most successful cloud business models are apparently the big players that benefit from a lot of knowhow, infrastructure and contacts from their traditional business. Business models of small niche providers are not related to the critical BMC. At this moment, we cannot evaluate if these business models will be successful, but maybe in a few years the cloud market has changed.

7 Conclusion

The purpose of our research was to determine success factors of a cloud business model. Our analysis of 45 firms and their cloud business models revealed a set of 39 success-related critical BMC. We proved the validity of the critical BMC with a cross-check and further analyses. Though our indicators for a successful business model can be seen as critical assumptions we can prove that not only single critical BMC randomly correlate with our indicators, but also a more holistic approach shows that these specific BMC can be found grouped disproportionately frequent in business models of firms with better business performance.

For the current market situation, the success-related characteristics describe experienced market players who expand their traditional business with existing knowhow, infrastructure and contacts and act as a universal cloud provider. The success of newcomers in the cloud market is limited and cannot be fully measured so far.

Our evaluation of the results with the success factors given from the literature show a valid linkage to the critical BMC. We gave advices for the significance, operationalization, and implementation of success factors within a cloud business model. The graphical summary of the results show an emphasis at the product related success factor followed by a high vertical integration as well as the charging and costs dimension.

For future research, we propose to break down our meta-approach and conduct selective analyses of firms with the same size, age or cloud level focus to produce results that are more comparable. Moreover, we suggest deepening the research on reliable indicators for the success of a business model.

Regarding our research, we accept some limitations. For the analysis of the cloud business models, we considered the promoted information at the websites and news feeds. We evaluated the subjective information by the double control principle but we cannot proof the reliability of the stated information by the firms (especially regarding the product performance). Further, the transfer of the BMC to success factors indicates that the business model framework cannot cover the success factors completely.

Besides, the key indicators for the business model success seem to be not a well-investigated research field. Especially in young markets, where companies do not declassify financial information, there should be more measures related to the potential success of a business model. Within our analysis, the indicators seem to favour big and established firms towards the newcomers in the cloud market. Therefore, the comparison between big and small firms is difficult.

8 References

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