How Does Cloud Computing Change the Strategic Alignment Between Business and IT?

Peter Fuzes
Corvinus University Budapest
Budapest, Hungary
peter.fuzes@uni-corvinus.hu

ABSTRACT

Strategic alignment between business functions of the company and the Information Technology (IT) department has been in the focus of strategic management research for decades. Several studies showed that IT systems could be a source of competitive advantage. However, due to lack of alignment with the company strategy, IT often does not fill this role.
Cloud computing changes the way companies use IT. Instead of building own IT systems, companies can use IT as a service, from external providers.
In this paper, we analyze the impact of cloud computing on the strategic alignment between business and IT. We conclude that cloud computing changes the role of IT department and use of cloud services can improve the alignment.

KEYWORDS

Business – IT Alignment, Cloud Computing, Cloud Services, IaaS, PaaS, SaaS, Business Needs

1 INTRODUCTION

Strategic alignment between business and the IT department has been widely researched for nearly four decades. Since the '90s several studies tried to understand the linkage between use of IT and company performance and prove that increased investment in IT systems results in superior company performance. However, research showed inconsistent result. While several studies showed positive correlation between IT investment and company performance [1] in many cases increased IT investment did not improve the company performance [2]. That phenomenon has been named as the 'IT Paradox' [3].

Scholars have offered two explanations for the IT paradox:

a. IT investment is not always aligned with organizational goals, strategy, resources or capabilities
b. The value of IT investment has not been captured properly by the studies. The real value of IT investments can be difficult to measure, for example in case of increased customer value.

The first is the more commonly mentioned reason and highlights the importance of alignment between the business functions and the IT department. Despite the understanding of its importance, business-IT alignment remains a top concern for IT executives and an area of interest of researchers.

2 REASONS FOR SUB-OPTIMAL ALIGNMENT

Based on the existing literature, the reasons for sub-optimal business-IT alignment can be organized into three categories [4].

a. The IT department and the business leaders do not understand each other' domains. Often, they are unable to express themselves in common language, explain their goals and complexities.
b. Today's rapidly changing environment business requirements are subject to frequent change. Sometimes it is a result of conscious change, but sometimes it is due to unforeseen happenings, failed promises and human errors. Business users often learn during the project what are the possibilities and they change the requirements for the IT system. As a

result, a gap opens between the stated objectives at the conception of the project and the requirement during and after execution.

c. Lack of flexibility of IT systems. IT systems create a complex architecture, where different layers built on each other and must work together seamlessly. To change a specific application in the complex architecture may require significant development.

3 CLOUD COMPUTING

Traditionally, companies owned the IT systems they used. They built their own data center, purchased the hardware (servers, storage) and software components for different layers of the software architecture, and developed customized solutions according to their business needs.

During the past decade, a new way of using IT has emerged as disruptive innovation [5, 6]. Due to newly developed IT technologies (such as virtualization) and availability of high speed, reliable internet connection, consumers do not need to have their own IT system; they can use IT as a service. This model is called 'cloud computing'.

There are three main service models of cloud services: [7-9]

a. Infrastructure as a Service (IaaS)
b. Platform as a Service (PaaS)
c. Software as a Service (SaaS)

4 ANALYSIS OF BUSINESS - IT ALIGNMENT IN CLOUD ENVIRONMENT

In cloud computing, part of the IT related tasks is transferred from the consumer's IT department to the cloud provider [10]. This has an impact on the role and responsibilities of the consumer's IT department. This modification of the role of IT department may have an impact on the business – IT alignment. In our analysis, we seek answer to the research question: how does cloud computing changes the strategic alignment between business and IT?

4.1 Methodology

As described earlier, researchers identified three key reasons for problematic IT-Business alignment:

a. Lack of understanding of each other's domains
b. The expressed need of business keeps changing
c. IT systems are not flexible enough to support the changing need of business

To answer the research question, we analyze what impact of cloud services on the three listed reasons and examine what the impact of the cloud on those problematic areas is. We analyze the different cloud service models (IaaS, PaaS, SaaS) for each of the three reasons. Our analysis is based on thorough review of the existing literature and deep understanding of cloud computing through industry experience.

4.2 Lack of Understanding Each Other's Domains

Impact of IaaS and PaaS

Traditionally, purchasing and installing hardware elements, operating system, database, and middleware software was the task of IT department. Those are the IT functions which can be covered by IaaS and PaaS cloud service. When those tasks are transferred to the cloud service provider, IT department remains in charge of those services from the company side as the key client [11].

The shift from on-prem to cloud does not have a direct impact on how the IT staff understands the business requirements of the functional users (HR, Finance, Customer Service, etc). The use of IaaS and PaaS cloud service instead of on-premise itself does not improve the (lack of) understanding of the business needs by the IT staff and vice versa.

The use of IaaS and PaaS can, however, have a long-term impact on how the IT staff understands the business. When part of the technical tasks is transferred to the cloud provider, the roles within the IT department can be reassigned, and the IT staff can focus more on strategic and business-related issues [12-14]. With reassigned roles, a 'collaborative partner' IT should have a better understanding of the

strategy and goals of functional units, therefore improve the understanding of the business domain.

Impact of SaaS

The key clients of SaaS services are the business users. When purchasing an ERP, HCM (Human Capital Management), recruitment or marketing solution, business users can articulate their needs and engage in direct discussion with the cloud supplier, who has experts with business knowledge on the specific solution field. Business users can bypass company IT, and order business application as a service (SaaS) from a cloud provider directly. In this case, understanding each other's domain between the IT department and business becomes irrelevant; the business; they can get access to business applications faster directly from the SaaS provider.

4.3 The Expressed Need of Business Keeps Changing

Business needs may change during an IT project due to the change in the competitive environment [4]. Also, business users may realize during the implementation project that the IT solution can deliver additional value for them with extensions or customization, and as a result they may change the requirements. In such situation, IT is 'shooting to a moving target'.

Even if the necessary budget is available to address the changed business need, the on-premise IT system may not be flexible enough to accommodate the required changes short term, which can negatively impact the business-IT alignment.

Impact of IaaS and PaaS

Using IaaS and PaaS cloud service makes the IT system more elastic and allows to rapidly scale up and down. With IaaS and PaaS, the IT department can respond to the changing need of the business better than with on-prem environment, therefore the alignment can improve.

Impact of SaaS

Increased elasticity also applies to SaaS solutions. However, SaaS has another aspect which can help to limit the customization required by the business users. Cloud providers offer limited customization options for their SaaS business applications [11, 15]. The public cloud SaaS model is based on provisioning standardized solution to large number of consumers with minimal customization. Limited room for customization does not allow the business users to keep changing the requirements; they have to accept the standard solution.

There is a trade-off between implementation time (and cost) and functionality. Accepting standard solutions may lead to shorter implementation cycle, however, the result may not be fully in-line with what the business users want or need. The market success of SaaS solutions shows that large portion of customers is willing to accept standardized solutions in exchange for rapid and less expensive implementation.

Cloud providers can also influence the customer needs by sharing best practices and experiences with other customers. This can help the business users to realize their latent needs earlier during the implementation process or give up requirements for unnecessary features.

Overall, using cloud-based business applications (SaaS) can have a positive impact on preempting and limiting the change of expressed business needs.

4.4 IT Systems Are Not Flexible Enough to Support the Changing Need of Business

The limited capability of the on-prem IT infrastructure a key reason for the inflexibility of company IT systems. The cycle of allocating financial resources, run the procurement process and implement the new hardware or software parts may take a long time. That long cycle can be seen by business users as inflexibility and lack of ability to address the business needs.

Impact of IaaS and PaaS

Cloud providers build large capacity data centers, and from those data centers they can rapidly scale up and down the service allocated to the customers. Therefore, when the company IT department uses IaaS and PaaS services, the existing IT infrastructure capacity will not be a

limiting factor to serve the business user's needs. Cloud provides elasticity, which is not the case with on-prem solutions [16]. As a result, IT systems become more flexible from the business point of view and able to support the changing business needs, thus the alignment may improve.

Impact of SaaS

Another reason for IT inflexibility is the complexity and inhomogeneity of existing systems. When integration is required with the existing systems, cloud services do not resolve this problem, however, those can be used for a new application outside of the current architecture.

For example, a SaaS solution for recruiting new employees (advertising available positions on-line, accepting and sorting uploaded CVs, providing a workflow for the selection process) does not necessarily have to be closely integrated with the company's ERP system. Instead of waiting for the upgrade of the on-premise ERP system to add a new recruitment module to it, the HR department may use a recruitment SaaS solution from an external provider, without dealing with the problem of inhomogeneity of the internal IT systems.

With SaaS, new business solutions can be provided in a shorter timeframe, which improves the alignment between the business needs and the IT solutions supporting those needs.

Based on the analysis, Table 1 summarizes the possible impact of cloud services on strategic alignment problems.

5 DISCUSSION

Based on our analysis, the use of cloud services may improve the alignment between business and IT. However, changing role of the IT department poses a threat as well: coordination of different IT systems may fall out of their hand. There is a risk that several systems will be used by the company – as result of the direct purchase by business units without the involvement of IT department – which will not be integrated or linked. The appearance of shadow IT can increase the risk of loss of valuable and confidential data [17].

IT department's loss of control over the company's IT system can increase the 'chaos' of existing systems, instead of decreasing it. Without coordination by the IT department, the Enterprise Architecture of the company may disintegrate [18, 19], which may have a negative impact on the company's operation. Therefore, it is imperative for the IT department to become a service integrator in a new governance model, linking and integrating different on-prem and cloud services.

The appearance of 'shadow IT' - when business users directly ordering cloud services from cloud providers without involving the IT department – is not only a possibility, but already reported on the market. Based on the response from 245 companies, a survey run by Select Hub concludes that "There is a movement away from allowing the experts in IT departments to exercise complete control (due to their expertise), and turn towards the users themselves, as the software environment encourages their participation" [20].

Tim Killenberg, senior vice president of N3 (an outsourced, integrated sales and marketing execution firm), says that "We are seeing a sharp increase in the number of line-of-business buyers who are empowered to make technology purchase decisions themselves. Reaching these buyers requires a new sales mindset and new skills" [21].

6 CONCLUSION

The role of the company's IT department is changing due to the growing use of cloud computing services, and this change could positively impact some of the problematic areas of business-IT alignment.

IT department has an important role to coordinate and integrate between different on-premise and cloud-based solutions. By outsourcing basic tasks to cloud providers and reassigning roles, IT department has better possibility to focus on higher level business solutions and to become the strategic partner of the business.

7 TABLES

	Alignment problem		
Cloud service model	**Lack of under-standing each other domains**	**The expressed need of business keeps changing**	**IT systems are not flexible enough to support the changing need of business**
IaaS PaaS	*No direct impact Reassigned role of IT department has potentially positive impact*	*Increased flexibility to accommodate changing needs* ***Positive impact on alignment***	*Increased flexibility to accommodate changing needs* ***Positive impact on alignment***
SaaS	*Working directly with SaaS provider beneficial for business users* ***Positive impact on alignment***	*Limited customization possibilities and use of best practices keep changing needs under control* ***Potentially positive impact on alignment***	*SaaS solution is more elastic than on-premise systems; faster deployment* ***Positive impact on alignment***

Table 1 - The possible impact of cloud services on strategic alignment problems

REFERENCES

[1] Y. E. Chan, S. L. Huff, D. W. Barclay, and D. G. Copeland, "Business strategic orientation, information systems strategic orientation, and strategic alignment," Information systems research, vol. 8, no. 2, pp. 125-150, 1997.

[2] A. S. Bharadwaj, "A resource-based perspective on information technology capability and firm performance: an empirical investigation," MIS quarterly, pp. 169-196, 2000.

[3] K. Celuch, G. B. Murphy, and S. K. Callaway, "More bang for your buck: Small firms and the importance of aligned information technology capabilities and strategic flexibility," The Journal of High Technology Management Research, vol. 17, no. 2, pp. 187-197, 2007.

[4] H. Benbya and B. McKelvey, "Using coevolutionary and complexity theories to improve IS alignment: a multi-level approach," Journal of Information technology, vol. 21, no. 4, pp. 284-298, 2006.

[5] N. Sultan and S. van de Bunt-Kokhuis, "Organisational culture and cloud computing: coping with a disruptive innovation," Technology Analysis & Strategic Management, vol. 24, no. 2, pp. 167-179, 2012.

[6] N. Sultan, "Knowledge management in the age of cloud computing and Web 2.0: Experiencing the power of disruptive innovations," International journal of information management, vol. 33, no. 1, pp. 160-165, 2013.

[7] D. Zissis and D. Lekkas, "Securing e-Government and e-Voting with an open cloud computing architecture," Government Information Quarterly, vol. 28, no. 2, pp. 239-251, 2011.

[8] P. Mell and T. Grance, "The NIST definition of cloud computing," 2011.

[9] N. Sultan, "Servitization of the IT industry: the cloud phenomenon," Strategic Change, vol. 23, no. 5-6, pp. 375-388, 2014.

[10] S. Floerecke and F. Lehner, "A revised model of the cloud computing ecosystem," in International Conference on Grid Economics and Business Models, 2015, pp. 308-321: Springer.

[11] S. Schneider and A. Sunyaev, "Determinant factors of cloud-sourcing decisions: reflecting on the IT outsourcing literature in the era of cloud computing," Journal of Information Technology, vol. 31, no. 1, pp. 1-31, 2016.

[12] S. Marston, Z. Li, S. Bandyopadhyay, J. Zhang, and A. Ghalsasi, "Cloud computing—The business perspective," Decision support systems, vol. 51, no. 1, pp. 176-189, 2011.

[13] M. G. Avram, "Advantages and Challenges of Adopting Cloud Computing from an Enterprise Perspective," Procedia Technology, vol. 12, no. Supplement C, pp. 529-534, 2014/01/01/ 2014.

[14] S. Jones, Z. Irani, U. Sivarajah, and P. E. Love, "Risks and rewards of cloud computing in the UK public sector: A reflection on three Organisational case studies," Information Systems Frontiers, pp. 1-24, 2017.

[15] Q. Li, C. Wang, J. Wu, J. Li, and Z.-Y. Wang, "Towards the business–information technology alignment in cloud computing environment: anapproach based on collaboration points and agents," International Journal of Computer Integrated Manufacturing, vol. 24, no. 11, pp. 1038-1057, 2011/11/01 2011.

[16] P. Manuel, H. Al-Hamadi, and K. Qureshi, "Challenges, strategies and metrics for supply-driven enterprises," Annals of Operations Research, vol. 233, no. 1, pp. 293-303, 2015.

[17] M. Silic, J. B. Barlow, and A. Back, "A new perspective on neutralization and deterrence: Predicting shadow IT usage," Information & management, no. in press, pp. 1-15, 2017.

[18] R. Butterfield, S. Maksuti, M. Tauber, C. Wagner, and A. Bicaku, "Towards Modelling a Cloud

Application's Life Cycle," in 6th International Conference on Cloud Computing and Services, 2016.

[19] M. Alaeddini, H. Asgari, A. Gharibi, and M. R. Rad, "Leveraging business-IT alignment through enterprise architecture—an empirical study to estimate the extents," Information Technology and Management, vol. 18, no. 1, pp. 55-82, 2017.

[20] G. Gheorghiu, "The CRM Buyer's Profile for SMBs ", 08.30.2017. Accessed on: 11.23.2017Available: https://selecthub.com/customer-relationship-management/crm-software-buying-trends/

[21] L. Calhoun, "10 Trends Shaping Software Sales in 2016," Accessed on: 11.22.2017Available: https://www.inc.com/lisa-calhoun/10-trends-shaping-software-sales-in-2016.html