The impact of cloud computing on business - IT strategic alignment

Peter Fuzes

Corvinus University Budapest

peter.fuzes@uni-corvinus.hu

Abstract: Research has shown that Information Technologies (IT) can be a source of competitive advantage for companies and can improve company performance. However, researchers have also found that not all IT investment leads to increased competitiveness and improved company performance. That phenomenon has been named as the 'IT Paradox'. One of the main reasons for the IT paradox is the missing strategic alignment between the business units and the IT department of the firm. Since the first decade of the 21st century, a new phenomenon, 'cloud computing' changes the way companies use IT. Instead of building own IT systems, companies can use IT as a service, from external providers. That new way of IT consumption also impacts the alignment between the business units of the firm and the IT department. 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 the IT department and the use of cloud services can improve the strategic alignment.

Keywords: Business – IT Alignment, Cloud Computing, Cloud Services

1 Introduction

Strategic alignment between business and the IT department has been widely researched for nearly four decades. To address this complex problem, Henderson and Venkatraman have developed the Strategic Alignment Model [1] in 1989. Since then, IT has become even more important for companies and institutions. In 2007, 87 percent of managers believed that IT is critical to their company's success [2].

During the '90s several studies tried to understand the linkage between use of IT and company performance and prove that increased investment into IT systems results in superior company performance. Company executives also share the view that IT is critical to overall company success [3].

However, research showed inconsistent result. While several studies showed positive correlation between IT investment and company performance [4-7] in many cases increased IT investment did not improve the company performance [8-10]. That phenomenon has been named as the 'IT Paradox' [11].

Scholars have offered two explanations for the IT paradox [11]:

1. IT investment is not always aligned with organizational goals, strategy, resources or capabilities

2. 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. Research shows that IT can contribute more to the company performance if IT is aligned with the business strategy [7, 12-16].

Moreover, IT can not only support the business strategy but can influence and lead it as well [17]. Oh and Pinsonneault find that "High-end strategic alignment (i.e., fit occurring when business strategy and IT strategy are both high) leads to superior performance compared to low-end strategic alignment (i.e., fit occurring when business strategy and IT strategy are both low)" [18]

Despite the understanding of its importance, business-IT alignment remains a top concern for IT executives and an area of interest of researchers [16, 19]. Based on several surveys during the past decades, alignment is always amongst the top concerns, in many cases, this is the #1 concern of the Chief Information Officers [20].

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.

First, the IT department and the business leaders do not understand each other' domains [21]. Often they are unable to express themselves in common language, explain their goals and complexities. To achieve sustained alignment, they need to engage in a continuous discussion and coordinate their efforts. CIOs should actively put effort into improving the alignment; they should participate in business meeting and achieve a better understanding of business priorities. They should also educate management about the possibilities of IT and how competitors use IT [22].

The value of discussion and creating common understanding appears to be asymmetric. Kearns and Lederer suggest that the CIO's participation in business planning has a more positive impact on the alignment than the CEO's participation in strategic IT planning [22].

The second reason is that in the 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 [21]. 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. Therefore, alignment should not be considered as a 'state' but "a journey that does not unfold in predictable ways" [21, p:285].

The third reason is the lack of flexibility of IT systems [21]. 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.

For example, if the company servers are used at the near maximum of their computing capacity, users can experience a slower response. IT needs to increase the server capacity, but financial resources may not be available for that. Even if the financial resources are available, the server room can be too small, so an additional room must be built with specific requirements for electricity, network connection, and air conditioning. This can be time-consuming. In this situation, when a business unit requests a new, relatively simple application, IT may answer that they will accommodate the request after the new server room is built and new server installed - in 6 months. That timeframe may be unacceptable for business users. Rapidly scaling up IT capacity to support the growth needs of a business unit can be an unattainable task for IT.

Moreover, companies usually have several IT systems working together in a complex integrated environment. Those systems were not built in a strategically planned manner; the development rather followed the uncoordinated request from different business units [23]. Some IT systems may even come from an acquired company and do not fit into the existing architecture at all.

When changing a specific application in the complex architecture, the IT department may need to modify several other applications too, which can be complex, costly, and time-consuming effort.

It is possible to reduce the complexity of organically grown IT systems, lower the number of customizations, streamline and standardize the IT systems, but it requires large upfront investment, which is often unacceptable for companies [23].

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. The IT systems were usually installed within the premises on the customer. Hence this is called the on-premise model.

During the past decade, a new way of using IT has emerged as disruptive innovation [24, 25]. 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' [24, 26-28]. In the new model, consumers (both companies and private users) become subscribers of cloud service providers. [29]

For a consumer, using cloud computing services is like using electricity [26]. When we plug an appliance into an outlet, we do not care how is the electricity generated and transferred to us. Simply, we just use the service of the complex electric power grid, and we pay for the consumption.

Cloud providers install their own data centers which include the necessary hardware and software parts to provide the service. Multitenancy is a key concept of cloud services, where several clients are served by the same hardware and software components.

From deployment point of view, when the services are provided for the general public, it is called 'public cloud'. There are also 'private clouds', which are built for a specific set of users, such as a company, organization, or government entities in a given country. There is a possibility to use a part of public and a part of private cloud for a complex architecture; this deployment model constitutes the 'hybrid cloud' [30, 31].

There are three main service models of cloud services: [28, 32, 33]

- Infrastructure as a Service (IaaS) – the cloud provider provisions to the customer fundamental hardware services, such as server capacity and storage. Consumers have their own choice to run operating system, database and application software based on their preference. In that model, consumers must own (or have the right to use) the software elements they install on the provisioned hardware service, this is not part of the cloud service.

- Platform as a Service (PaaS) – the cloud provider provisions the hardware services and basic software modules (such as operating system, database system, middleware) to the consumer, and the consumer runs its own business application on the top of that stack.

- Software as a Service (SaaS) – the cloud provider provisions business applications service to the consumer (for example, ERP, HR, Recruitment, CRM or Purchasing). This service includes the underlying hardware and software layers as well, seamlessly to the consumer.

The key advantages of cloud computing [29, 31, 34-37]:

- Subscription based service does not require a large upfront investment. Services are paid as an operational expense (Op-ex), not from Cap-ex

- Service can be scaled up and down rapidly, based on the need of the consumer needs

- Lower barrier to innovation

- The complexity of IT systems moves from the consumer to the cloud provider.

4 Analysis of Business - IT alignment using Cloud Services

In cloud computing, part of the IT related tasks is transferred from the consumer's IT department to the cloud provider [38]. 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 [21-23]. Those reasons are:

- Lack of understanding each other's domains

- The expressed need of business keeps changing

- 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 conduct the analysis for the different cloud service models (IaaS, PaaS, SaaS) for each of the three reasons. Our analysis is based on a thorough review of the existing literature and deep understanding of cloud computing through industry experience.

4.2 Lack of Understanding Each Other's Domains

4.2.1 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 [39].

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 [29, 34, 36]. In the cloud environment, the role of the IT department is changing, from managing the technology platform to become a collaborative partner of the business [40]. Instead of losing its importance in the company's operation, IT becomes a strategic partner of the supply chain, marketing and service operations which are using cloud-based solutions [41]. 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.

An example of the IT organization becoming a collaborative partner of the business is the financial firm Capital One. They moved the on-premise IT colutions to cloud by using IaaS and PaaS, and this change allowed the IT organization to work more on customer related business solutions. As George Brady Executive Vice President and Chief Technology Officer of Capital One said: *"The most important benefit of working with AWS (a cloud vedor) is that we don't have to worry about building and operating the infrastructure necessary to do that and can instead focus our time, money, and energy on creating great experiences for our customers"* [42].

4.2.2 Impact of SaaS

The key clients of SaaS services are the business users [39]. 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. For example, the cloud provider's experts can explain to the HR manager

the functions of their HCM SaaS solution, and what are the experiences with other customers. This type of discussion can happen in on-premise environment as well, but, in case of an on-premise solution, the IT department must be involved into the discussion to provide IT infrastructure and integration for the business application. In cloud environment business users can order SaaS service directly from the cloud provider and use those in self-service mode [39], they do not necessarily need to ask services from the company's IT department. Therefore, business users can bypass company IT, and order business application as a service (SaaS) from a cloud provider directly [43]. In this case, understanding each other's domain between the IT department and business becomes irrelevant.

The SaaS application may need to work together with the existing systems of the customer, and this requires cooperation from the IT department. In that case, the IT department can only partially bypassed.

Partially or fully bypassing the IT department can speed-up the purchasing process and eliminate the need for explaining the business needs to IT experts who may not understand the business. This can be beneficial for the business; they can get access to business applications faster.

One of the largest Central European company's talent recruitment project was a good example of a situation when the business user department was working directly with the cloud vendor, bypassing the IT organization. The company's HR department was looking for a business soluiton to advertise open positions on their portal, accept CVs and manage the talent selection process on a digital platform. The project was succesfull, it was delivered on-time and on-budget and fully met the customer's expectations. The interviews we conducted with the cloud vendor and the customer revealed, that the success of the project largely relied on the direct communication between the HR management and recruitment specialists of the customer company and the functional experts of the cloud vendor. As Istvan Moczo, Consulting Director of Oracle explained "our business experts were working with the customer's business experts, and they understood each other very well. There was little involvement of the IT department".

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 [21]. 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'. For example, business may ask to include more data sources into the solution, integrate the solution with other applications, or customize the built-in business process to better map their existing workflow. This process extends the scope of the IT

project and may require additional resources such as increased implementation budget, additional hardware, and software elements.

Even if the increased budget is available, the on-premise IT system may not be flexible enough to accommodate the required changes short term. For example, increasing the hardware capacity may require a longer time than it would be acceptable for the ongoing project. Therefore, the changing needs of the business users may not be fulfilled within the required timeframe, and this can negatively impact the business-IT alignment.

4.3.1 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.

4.3.2 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 [29, 39]. 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 a 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 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.

4.4.1 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 [44]. Cloud provides elasticity, which is not the case with on-prem solutions [45]. When using a cloud-based solution, companies may become more flexible an agile [46]. 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.

4.4.2 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.

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

Cloud service model	Alignment probem		
	Lack of understanding 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 a **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

5 Discussion

Despite the major impact of cloud computing, there is a lack of academic research on its impact on changing role of IT and strategic alignment. Research firms and market analysts however already report figures which are signs of the change.

According to IDC, business units of companies already rely heavily on external IT services (such as cloud) versus the company's IT department [47]. IDC expects that by 2020 the spending on external IT by business units will nearly equal the spending of IT department.

IDC reports the appearance of 'shadow IT', when business units bypass the IT department. According to IDC, "Shadow IT projects are funded from the functional area budget without the knowledge, involvement, or support of the IT department."

Another research firm, Gartner highlights that marketing departments are extensively using external IT services for their campaigns. Gartner predicted that already in 2017 marketing spent more on technology than IT [48].

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" [49].

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" [50].

Besides the benefits of the model where business users order IT services directly from cloud providers, there are threats as well. Coordination of different IT systems falls out of the hand of IT department. 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 [51].

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 [52, 53], which may have a negative impact on the company's operation [46]. 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 [39].

6 Summary

The role of the company's IT department is changing due to the growing use of cloud computing services. The changing role will impact the long-researched alignment between business and IT.

In this paper, we analyzed the potential impact of cloud computing on the business-IT alignment. We concluded that cloud services could positively impact some of the problematic areas of business-IT alignment, therefore the use of cloud services may lead to better alignment.

The IT department's role is changing in the cloud environment. IT 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 a better possibility to focus on higher level business solutions and to become the strategic partner of the business.

The findings of this study are based on an analysis of the literature and industry experience of the author. The findings should be empirically tested, which can be a subject of future research.

References

[1] J. C. Henderson and N. Venkatraman, "Strategic alignment: a framework for strategic information technology management," 1989.

[2] B. Worthen, "The IT Factor: Tech Staff's Bigger Role," *The Wall Street Journal,* vol. December 4th 2007, no. December 4th 2007, December 4th 2007 2007.

[3] D. Q. Chen, M. Mocker, D. S. Preston, and A. Teubner, "Information systems strategy: reconceptualization, measurement, and implications," *MIS quarterly,* vol. 34, no. 2, pp. 233-259, 2010.

[4] R. Kohli and S. Devaraj, "Measuring information technology payoff: A meta-analysis of structural variables in firm-level empirical research," *Information systems research,* vol. 14, no. 2, pp. 127-145, 2003.

[5] G. Piccoli and B. Ives, "IT-dependent strategic initiatives and sustained competitive advantage: a review and synthesis of the literature," *MIS quarterly,* vol. 29, no. 4, pp. 747-776, 2005.

[6] N. Melville, K. Kraemer, and V. Gurbaxani, "Information technology and organizational performance: An integrative model of IT business value," *MIS quarterly,* vol. 28, no. 2, pp. 283-322, 2004.

[7] 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.

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

[9] B. Dehning and V. J. Richardson, "Returns on investments in information technology: A research synthesis," *Journal of Information Systems,* vol. 16, no. 1, pp. 7-30, 2002.

[10] R. Santhanam and E. Hartono, "Issues in linking information technology capability to firm performance," *MIS quarterly,* pp. 125-153, 2003.

[11] 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.

[12] J. W. Palmer and M. L. Markus, "The performance impacts of quick response and strategic alignment in specialty retailing," *Information Systems Research,* vol. 11, no. 3, pp. 241-259, 2000.

[13] P. P. Tallon, "Does IT pay to focus? An analysis of IT business value under single and multi-focused business strategies," *The Journal of Strategic Information Systems,* vol. 16, no. 3, pp. 278-300, 2007.

[14] A. A. Yayla and Q. Hu, "The impact of IT-business strategic alignment on firm performance in a developing country setting: exploring moderating roles of environmental uncertainty and strategic orientation," *European Journal of Information Systems,* vol. 21, no. 4, pp. 373-387, 2012.

[15] S.-J. Huang, M.-S. Wu, and L.-W. Chen, "Critical success factors in aligning IT and business objectives: A Delphi study," *Total Quality Management & Business Excellence,* vol. 24, no. 9-10, pp. 1219-1240, 2013/10/01 2013.

[16] T. Coltman, P. Tallon, R. Sharma, and M. Queiroz, "Strategic IT alignment: twenty-five years on," *Journal of Information Technology,* vol. 30, no. 2, pp. 91-100, 2015.

[17] R. Agarwal and V. Sambamurthy, "Principles and models for organizing the IT function," *Mis Quarterly,* vol. 1, no. 1, p. 1, 2002.

[18] W. Oh and A. Pinsonneault, "On the assessment of the strategic value of information technologies: conceptual and analytical approaches," *MIS quarterly,* pp. 239-265, 2007.

[19] J. E. Gerow, J. B. Thatcher, and V. Grover, "Six Types of IT-Business Strategic Alignment: An investigation of the constructs and their measurement," *European Journal of Information Systems,* vol. 24, no. 5, pp. 465-491, 2015.

[20] J. Luftman and T. Ben-Zvi, "Key issues for IT executives 2011: Cautious optimism in uncertain economic times," *MIS Quarterly Executive,* vol. 10, no. 4, 2011.

[21] 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.

[22] G. S. Kearns and A. L. Lederer, "A resource-based view of strategic IT alignment: how knowledge sharing creates competitive advantage," *Decision sciences,* vol. 34, no. 1, pp. 1-29, 2003.

[23] D. Shpilberg, S. Berez, R. Puryear, and S. Shah, "Avoiding the alignment trap in IT," *MIT Sloan Management Review,* vol. 49, no. 1, p. 51, 2007.

[24] 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.

[25] 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.

[26] R. Buyya, J. Broberg, and A. M. Goscinski, *Cloud computing: Principles and paradigms*. John Wiley & Sons, 2010.

[27] B. Furht and A. Escalante, *Handbook of cloud computing*. Springer, New York, United States, 2010.

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

[29] 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.

[30] M. Armbrust *et al.*, "A view of cloud computing," *Communications of the ACM,* vol. 53, no. 4, pp. 50-58, 2010.

[31] V. Chang, R. J. Walters, and G. Wills, "The development that leads to the Cloud Computing Business Framework," *International Journal of Information Management,* vol. 33, no. 3, pp. 524-538, 2013/06/01/ 2013.

[32] 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.

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

[34] 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.

[35] A. Lin and N.-C. Chen, "Cloud computing as an innovation: Percepetion, attitude, and adoption," *International Journal of Information Management,* vol. 32, no. 6, pp. 533-540, 2012.

[36] 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.

[37] D. Truong, "How cloud computing enhances competitive advantages: A research model for small businesses," *The Business Review, Cambridge,* vol. 15, no. 1, pp. 59-65, 2010.

[38] 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.

[39] 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.

[40] N. Thompson, "Organizational Leadership Challenges in Adopting Cloud Computing: A Systematic Literature Review," Nova Southeastern University, 2017.

[41] A. Bharadwaj, O. A. El Sawy, P. A. Pavlou, and N. V. Venkatraman, "Digital business strategy: toward a next generation of insights," 2013.

[42] AWS. (2019, 01.20.). *"How to Cloud" with Capital One*. Available: https://aws.amazon.com/solutions/case-studies/capital-one-enterprise/

[43] R. El-Gazzar, E. Hustad, and D. H. Olsen, "Understanding cloud computing adoption issues: A Delphi study approach," *Journal of Systems and Software,* vol. 118, pp. 64-84, 2016/08/01/ 2016.

[44] I. K. Azeemi, M. Lewis, and T. Tryfonas, "Migrating to the cloud: lessons and limitations of 'traditional'IS success models," *Procedia Computer Science,* vol. 16, pp. 737-746, 2013.

[45] 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.

[46] M. Werfs, G. Baxter, I. K. Allison, and I. Sommerville, "Migrating software products to the cloud: an adaptive STS perspective," *Journal of International Technology and Information Management, Volume 22 Number 3,* 2013.

[47] IDC, "Technology Purchases from Line of Business Budgets Forecast to Grow Faster Than Purchases Funded by the IT Organization, According to IDC," 03.23.2017. Accessed on: 11.23.2017 Available: https://www.idc.com/getdoc.jsp?containerId=prUS42405217

142

[48] Gartner, "2016-2017 Gartner CMO Spend Survey Reveals the CMO's Growing Mandate," 01.10.2017. Accessed on: 11.21.2017Available: https://www.gartner.com/smarterwithgartner/2016-2017-gartner-cmo-spend-survey-reveals-the-cmos-growing-mandate/

[49] 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/

[50] 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

[51] 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.

[52] 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.

[53] 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.