

Digital Transformation Approach for Improving Public Services Using Cloud Computing Technology. Case Study Bucharest, Romania

Shuleski Darko

The Bucharest University for Economic Studies, Romania
darko.shuleski@man.ase.ro

Radu Ioan

The Bucharest University for Economic Studies, Romania
iradu@man.ase.ro

Anton Cristian Ioan

The Bucharest University for Economic Studies, Romania
tony_cristi2004@yahoo.com

Crina Veronica Cristea

The Bucharest University for Economic Studies, Romania
crina.cristea@gmail.com

Abstract. The permanent evolution of the economy requires companies to adapt. The competition is growing so fast and also the IT sector is faced paced, quickly changing and difficult to keep up with. Nowadays every organization use (IT&C) Information Technology and Communications, which includes every communications devices, smartphones, computers, hardware, software etc. Information Technology and Communication is primarily responsible for improving organizations processes and creating a competitive advantage. The most important factors for organizations development are IT&C software's such as ERP (Enterprise Resource Planning), CRM (Customer Relationship Management), SCM (Supply Chain Management), (DSS) decision support system and other software's which can improve their processes. IT&C is very complex, also dynamic and expensive to keep a pace with. Many organizations are confronting with various issues on management processes. We are talking about automatization of management processes and migrate their date base in cloud, using the IT&C. The term Cloud Computing or Computing as a service over the internet, according IBM "the cloud" is the delivery of on-demand computing resources-everything from applications to data centres-over the internet on a pay-for-use basis. According Professor McCarthy "The computer utility could become the basis of new and important industry". Nowadays organizations are confronting with one of the important issues of IT&C, which is adopting this Technology for their processes on their needs. Is very easy to learn how to use Information Technology, but it is very hard to understand, identify the issues and adapt to each of organization's needs. In this paper we are trying to create a model for improving business process with using Cloud Computing Technology and In Memory database Technology, for reducing costs and creating competitive advantage on the market. Also we are trying to create a new strategy approach which can be used for implementing Cloud Computing Technology in public and private sector to improve the processes for each organization. Our research is showing a new way to digital business transformation with testing hypothesis and using qualitative method and data analysis from Bucharest Public services.

Keywords: IT&C, change management, cloud computing, strategic management

1 Introduction

Cloud computing technology offers many opportunities and helps organizations to improve their business processes and use their technology more efficiently. (Marston S. 2011) defines cloud computing technology as “an information technology service model where computing services (both hardware and software) are delivered on-demand to customers over a network in a self-service fashion, independent of device and location” Low costs, time saving, flexibility, efficiency and strategic value are some benefits of using cloud computing. According to (IBM Cloud 2017) the benefits of cloud computer technology are: flexibility on the first place, users can scale services to fit their needs, customize applications and access cloud services from anywhere only with an internet connection. Cloud infrastructure scales on demand to support fluctuating workloads, users can choose private, public or hybrid cloud, and they can determinate their level of control with one of following options: software as a service (SaaS), platform as a service (PaaS), Infrastructure as a services (IaaS); Efficiency - organization users can get applications to market quickly without worry about underlying infrastructure costs or maintenance. Pay structure means users only pay for the resources they use; Strategic value – cloud services give organization a competitive advantage by providing the most innovative technology available.

2 Literature review

2.1 Cloud computing classification:

(NIST 2017) defines cloud deployment models as follows. “Private cloud. The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises. Community cloud - The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Public cloud - The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

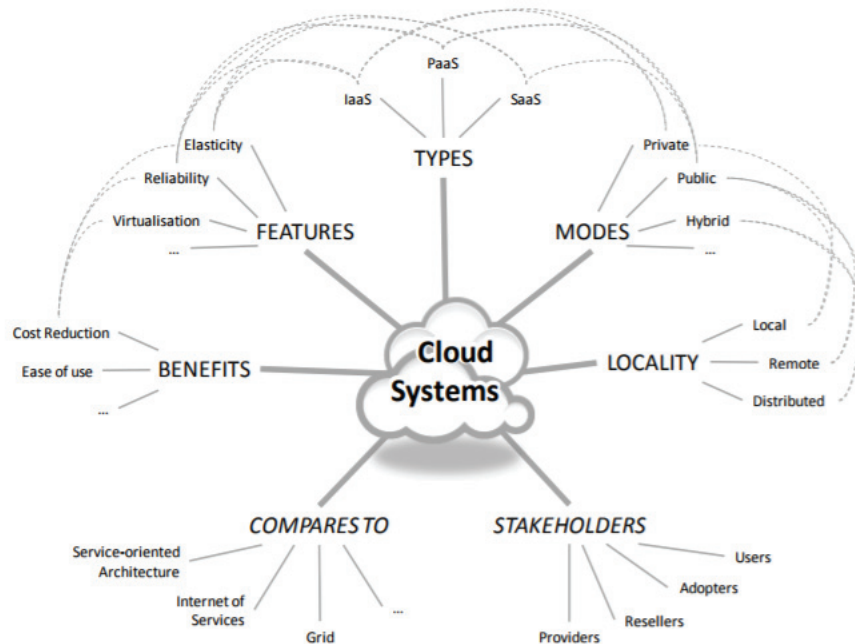
Hybrid cloud - The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds). ”

Service Models as shown in figure 1:

- Cloud Software as a Service (SaaS). The capability provided to the consumer is to use the provider’s applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.
- Cloud Platform as a Service (PaaS). The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly applications hosting environment configurations.

- **Cloud Infrastructure as a Service (IaaS).** The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems; storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

Figure 1: Non exhaustive view on the main aspects forming a cloud system



Adapted from (Schubert. L 2012)

According the (IBM Cloud 2017), infrastructure as a service (IaaS) is a cloud computing offering in where a vendor provides users access to computing resources such as servers, storage, and networking. Organizations use their own platforms and applications within a service provider's infrastructure.

Key features

- Instead of purchasing hardware outright, users pay for IaaS on demand;
- Infrastructure is scalable depending on processing and storage needs;
- Saves enterprises the costs of buying and maintaining their own hardware;
- Because data is on the cloud, there is no single point of failure;
- Enables the virtualization of administrative tasks, freeing up time for other work.

Platform as a service (PaaS) is a cloud computing offering that provides users a cloud environment in where they can develop, manage, and deliver applications. In addition to storage and other computing resources, users are able to use a suite of prebuilt tools to develop, customize and test their own applications.

Key features:

- PaaS provides a platform with tools to test, develop, and host applications in the same environment;
- Enables organizations to focus on development without having to worry about underlying infrastructure;
- Providers manage security, operating systems, server software, and backups;
- Facilitates collaborative work even if teams work remotely.

Software as a service (SaaS) is a cloud computing offering that provides users with access to a vendor's cloud-based software. Users do not install applications on their local devices. Instead, the applications reside on a remote cloud network accessed through the web or an API. Through the application, users can store and analyse data and collaborate on projects.

Key features

- SaaS vendors provide users with software and applications on a subscription model;
- Users do not have to manage, install, or upgrade software; SaaS providers manage this;
- Data is secure in the cloud; equipment failure does not result in loss of data;
- Use of resources can be scaled depending on service needs.

Applications are accessible from almost any Internet-connected device, from virtually anywhere in the world.

SAP HANA - one of the first in-memory database management systems that store and retrieve data performing advanced analytics. It combines state of the art data base with advanced analytical processing, application development capabilities, data integration and quality handling analytical in memory and transactions on a single data copy.

This can allow the delivery in real time of transactions and analytics. Hana databases are smaller than traditional architectures because of data compression.

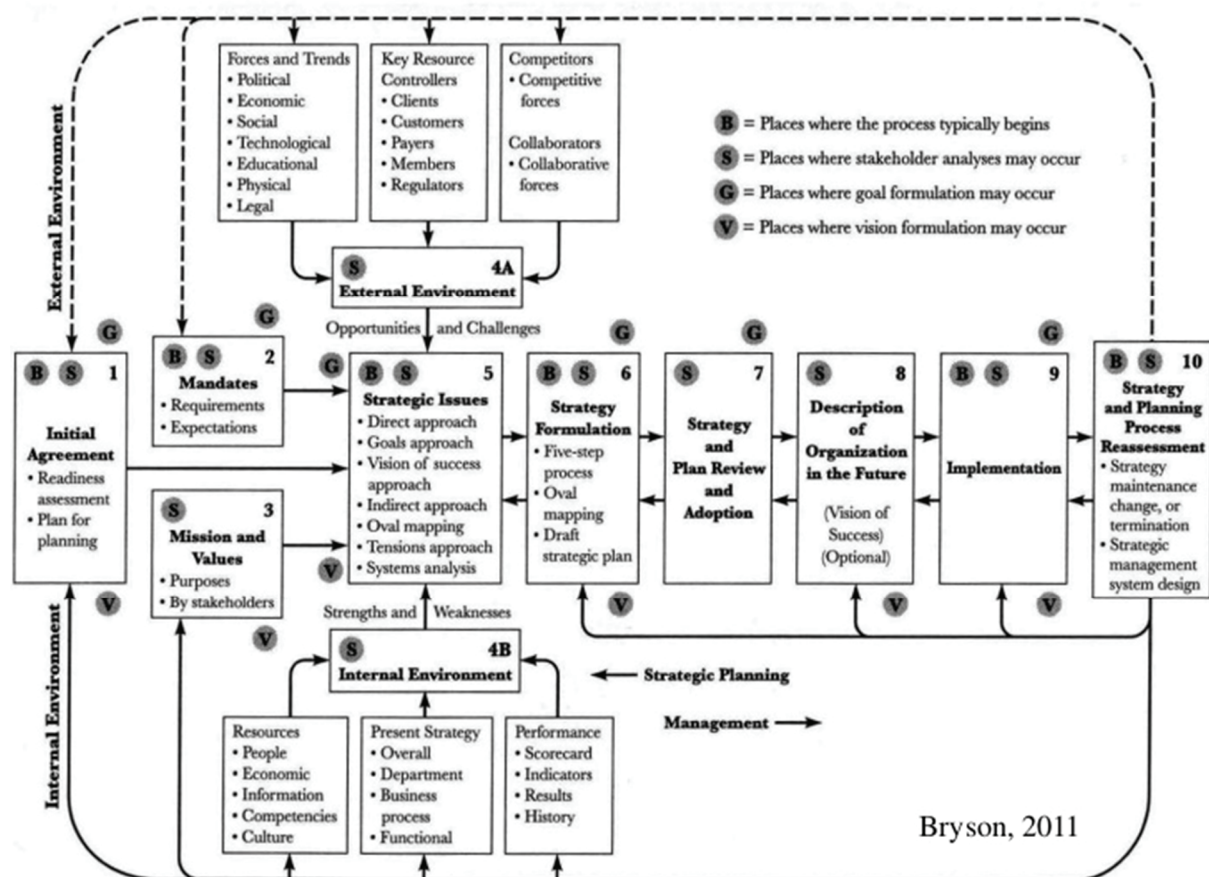
2.2 Strategic Management

Strategic management is the formulation and implementation of the major goals and initiatives taken by a company's top management on behalf of owners, based on consideration of resources and an assessment of the internal and external environments in which the organization competes (Nag 2007). (Poister 1999) state that "Strategic planning is a principal element but not the essence of strategic management, which also involves resource management, implementation and control and evaluation" (Poister 1999). Similarly, (Bryson 2011) 5 makes the following distinctions: • Strategic planning: "A deliberative, disciplined effort to produce fundamental decisions and actions that shape and guide what an organization (or other entity) is, what it does, and why it does it." • Strategic management: " The integration of strategic planning and implementation... in an ongoing way to enhance the fulfilment of mission, meeting of mandates, and sustained creation of ... value". (Poister T. H. 2010, 247) likewise defines strategic planning as "a big picture approach that blends futuristic thinking, objective analysis and subjective evaluation of values, goals, and priorities, to chart a future direction and courses of action to ensure an organization's vitality, effectiveness and ability to add value". For him, strategic management is "concerned with ensuring that strategy is implemented effectively and encouraging strategic learning, thinking and acting on an ongoing basis....implementation aspect involves working all the "management levers" in concerted effort.... largely matter of utilizing and coordinating all of the resources and venues at top management's disposal,...in the interest of advancing the strategic agenda." (Poister T. H. 2010, 249)

The aforementioned levers include operational and business planning, budgets, analytical and problem-solving capabilities, workforce development and training, internal and external communications, programs delivery mechanisms, legislative agenda's, leadership skills and the ability to influence other actors in networks. These concepts of can be seen as part of the transformation process inside the strategic logic, as proposed by (Desmidt. 2005), in their seminal work on strategy in the public sector, indeed state that "...sweeping change calls for a transformation... The transformed organisation develops more flexibility and adaptability ...increases its repertoire of responses,...". According to (Poister 1999, 310), "Strategic planning has gained widespread currency in government. Agency managers now view it as a valuable tool for charting future directions in changing and sometimes turbulent environments". (Bryson J. M. 2011, 24) states that "...the heart of the strategic planning process...is the identification and resolution of strategic –that is very important and consequential- issues." Issues are seen as critical challenges affecting the organisation's mandates, mission, product/service level and mix, clients, users, payers, costs, financing, organisation and

management. Reasonable agreement on how to resolve issues can then be recast into goals, policies, programs and actions. For (Bryson J. M. 2011) issues should be phrased as questions that can have more than one answer e.g. “How will we deal with the pressure an ageing population is putting on the pension system?”. (Bryson J. M. 2011) attempts to provide a comprehensive concept of strategic management as depicted below in the full details of the system are provided in annex. Here, we focus on the core concept of “issues”. Figure 2, with issues at the centre. The full details of the system are provided in annex. Here, we focus on the core concept of “issues”.

Figure 2: Bryson’s framework of strategic management



Adapted from (Bryson J. M. 2011)

According to (Bryson J. M. 2011) issues arise when : 1) events beyond the control of an organization make or will make it hard to impossible to achieve basic objectives, which is usually a threat; 2) technology, cost, financing (incl. competition with others for the same pot of money), staffing, management or political choices for achieving basic objectives change, which can be a threat or opportunity; 3) changes in mission, mandates or internal/external factors (incl. user preference) suggest opportunities to: • make significant improvements in quantity or quality of services; • achieve significant cost of service reductions • introduce new services; • combine, reduce or eliminate services (or surrender to the private / third sector); • create more public value in general. The idea is that regular issue identification (as challenges the organization can do something about) allows to “get in front of the issue” and “... thus typically –or at least ideally- are not current problems or crises, although...obviously decision makers should think strategically about how to address current problems and crises” (Bryson J. M. 2011, 193) The implication is that something like the refugee crisis that has been affecting the European Union for quite some time is not something that is to be

resolved by strategic planning but that sound strategic planning should have enabled governments in the EU to avoid this crisis in the first place by recognizing issues at a time when it was still possible to “get in front” of the issue. (Bryson J. M. 2011, 58-188) also distinguishes strategic from operational issues:

- Strategic issues (labelled adaptive, complex, developmental) alter the organization and its core business and require:
 - Knowledge exploration;
 - New concepts;
 - Changes in basic stakeholders (e.g. clients) and/or relations;
 - Radical new technology;
- Operational issues (technical, complicated) rather require:
 - Knowledge exploitation;
 - Refining but not questioning current strategy;
 - o Process management and improvement;
 - Use of existing technologies;
 - o Maintaining relations with existing stakeholders.

The new IT termed “cloud computing” is rising in popularity at a rapid rate. For example, Apple's iCloud service allows consumers to synchronize the movie they were watching across smartphones, desktops, and TVs and download their own data without physical memories such as flash drives. Similarly, Google Docs allows online consumers to use word processors or spreadsheets without purchasing or installing these programs. The recent emergence of smartphones, tablet PCs, and smart TVs has raised public interest in cloud computing services.

(P. 2010) identified cloud computing as the top ten strategic technologies for 2011 and Yoon noted that global information technology (IT) enterprises such as Google, Amazon, Apple, and Microsoft intend to invest significantly in new cloud computing projects as a future core business. Market research institutions are bullish on such prospects and predict positive outcomes for cloud computing. 10 According to Lee , the worldwide market size of cloud computing is expected to increase from USD 152 billion in 2011 to USD 343 billion in 2014. In particular, the mobile cloud computing market, which is closely related to the smartphone market, is forecast to expand substantially. According to ABI Research , the application market for the mobile cloud is expected to increase from USD 0.4 to 9.5 billion between 2009 and 2014.

9The emergence of cloud computing services has led to an increased interest in the technology among the general public and enterprises marketing these services. Although there is a need for studies with a managerial relevance for this emerging market, the lack of market analysis hampers such investigations.

2.3 Change Management

Change management is a collective term for all approaches to preparing and supporting individuals, teams, and organizations in making organizational change. It includes methods that redirect or redefine the use of resources, business process, budget allocations, or other modes of operation that significantly change a company or organization. Organizational change management considers the full organization and what needs to change, while change management may be used solely to refer to how people and teams are affected by such organizational transition. It deals with many different disciplines, from behavioural and social sciences to information technology and business solutions (PROSCI n.d.) Challenges affect agencies and organizations of all shapes and sizes — and the government is no exception. Top-of-mind concerns at governmental agencies include the familiar challenges faced in the private sector — such as employee engagement, training, recruiting, and retention — as well as challenges unique to the public sector, such as changes to the agency's mission or presidential transitions. Governmental agencies can address these challenges through various organizational change management strategies. Yet effecting change is never easy and the failure rate for change management efforts of all types is around 70 percent. (Concepts 2016) “Change Management Needs to Change.” Harvard Business Review) First of all it is important to identify change drivers and high-performing organizations .

All organizations experience challenges to maintaining an engaged, productive workforce. Pipeline problems, digital disruption, and heightened customer expectations all drive the need for change at governmental organizations. Regardless of size or mission, these organizations must recruit and retain top talent, engage that talent, and prepare for workforce generational shifts as their employees begin to

retire. (Concepts 2016). “Public Sector Has Some of Oldest Workers Set to Retire.” Governing) By identifying the greatest change drivers their organizations face, governmental agencies can take steps to mitigate challenges and successfully enact change. Budget is the top concern at more than half of all organizations and Slow labour also feeds into expectations that talent recruiting difficulty will be a high-impact change driver in the near future. Add to this mix the third top concern — impending retirements — and a picture emerges: organizations are worried about losing their retiring employees, who may or may not be replaced by younger workers, due to constrained budgets or other factors. Government agencies must simultaneously deal with shifts in regulatory guidance, mission requirements, the availability of mission-critical skillsets, and challenges in recruiting and retaining a high performing workforce all while responding to increasing expectations for a high quality citizen experience, the influence of Congress, and the rapid expansion and impact of technology. Change in the public sector often involves resolving conflicting interests. Public sector changes may not be more difficult than those in the private sector, but they are different. Private sector changes might be just as complex, geographically diverse and impact just as many people In 1970, Stan Herman introduced the idea of the Organizational Iceberg to depict the strength of the informal and hidden elements in organization life (Herman Chicago, IL). He represented the formal organization as the buildings, equipment, and people working in a common area, a relatively small part of the iceberg above the water line. The informal, hidden organization was represented by the far larger bulk below the waterline. It included the values, norms, attitudes, and expectations of people who work within an organization. The strength of the iceberg analogy is that it illustrates the relative importance and size of the informal part of an organization. The size and strength of the informal organization can vary dramatically in public sector organizations. Police forces, military organizations and churches are examples of agencies where the informal organization and its underlying values and norms will shape the organization and the way it carries out its mission. Prison systems, post offices and departments of motor vehicles may be dominated by long service employees with deeply entrenched behavioural culture, which may either facilitate or impede change. Military organizations can quickly adapt to a wide variety of challenges from fighting forest fires to fighting wars. Other agencies, like the central service agencies of government, may be more fluid and transient and have less powerful cultures. In a new organization or one with high turnover the underlying culture below the water line in our iceberg analogy might not be an impediment to change. It is important to understand the strength of the cultural norms and the degree to which they are aligned with the proposed change is essential. There are several principles, which provide a holistic framework for introducing change (Gilbert 2002) (Kaplan 2006) (Ulrich 1998): Principle 1 – Forming a guiding coalition : It is important to create a powerful guiding coalition, which is defined as a committed leadership team, in addition to steering committees, working groups, or implementation committees. Principle 2 – Recognizing and responding to people who might be resistant to the change Kurt Lewin identified a resistance to a change as a force, like inertia that is preventing the disruption of an old equilibrium (Lewin 1969). Social scientists have taken this principle and suggested that there are similar forces that affect the process of change in organizations (Lewin 1969). Principle 3 – Establishing a need for change : much of the change literature has highlighted the importance of establishing a need for change and to create a consensus around this need. Since some of the more successful change efforts are a result of traumatic events or crisis, some change researchers have advocated that managers might use of radical change strategies like reengineering (Hammer 1993). Such organizational development intervention usually begin with a frank discussion of some of the facts and perceptions of the issues, statements of satisfaction, inefficiencies and ideas that participants might find useful in change (Ajzen 1991) (Burke, Organization Development: Principles and Practices 1982) (Burke, Organization Change: Theory and Practice 2002), (Beckhard 1987). Principle 4 – Articulating envisioned outcomes: According to (Collins 1997), a vision statement describes the core values and purpose guiding an organization as well as an envisioned future of a change. Although a vision statement can easily become a bunch of words that everyone forgets, organizations with carefully crafted visions can significantly outperform the stock market over long periods of time (Collins 1997).

Principle 5 – Establishing a process to implement the plan : A plan is merely a hypothesis about how to proceed if all the assumptions that underlie the plan are correct. It is a virtual certainty that at least some of your assumptions will be wrong. Eisenhower illustrated this with his statement, “Plans are worthless, but planning is everything” (Eisenhower 1957). He was highlighting the importance of a planning process to help people understand the contingencies and unexpected. While planning is often described as a formal process for focusing and scheduling how we use resources to achieve objectives, a great deal of attention illustrates the process underlying the planning (Mintzberg 1994) (Ulrich 1998). Principle 6 – Focusing on continuous improvement rather than objective rightness of measurement Much more time is spent communicating facts and results and objective proof. A survey of 300 electronic companies revealed that 73 percent of the companies had reported having a total quality program under way, but 63 percent of these failed to reduce defects by even 10 percent (Schaffer 1992). While it is always useful to state goals and objectives, it is important to foster a program of continuous improvement, to focus actions, initiatives, and measures that are being taken. Principle 7 – Developing a commitment plan : A commitment plan is a strategy describing a series of action steps devised to secure the support of those people who are vital champions of the change effort” (Beckhard 1987). In public sector agencies, these champions may well extend beyond organizational boundaries. Successful implementations require a systematic analysis of who is committed to the idea, who is able and willing to provide resources, and who is willing to carry out and persevere with the new process. In any change process, a critical mass of people is necessary to assure implementation (Ulrich 1998). Principle 8 – Managing by walking around : Twenty years ago, Tom Peters and Robert Waterman described “management by walking around” as a process where leaders and managers were seen and involved in face-to-face interactions with front-line staff. “Management by walking around” recognizes that it is very easy for managers and the guiding coalition to become distanced and isolated. The process of “walking around” provides the driving forces for propelling an informal organization underlying any change (Peters 1982) Principle 9 – Changing structures and HR systems: Human resources are “people” resources in any organization and are increasingly being viewed as just as important as capital and financial resources in effective performance and competitive advantage. “HR is where the tire hits the road” for a formal organization, just as “management-by walking” around might illustrate change in the informal organization (Becker 2001) (Wagar 1999) (Fitz-enz 2000).

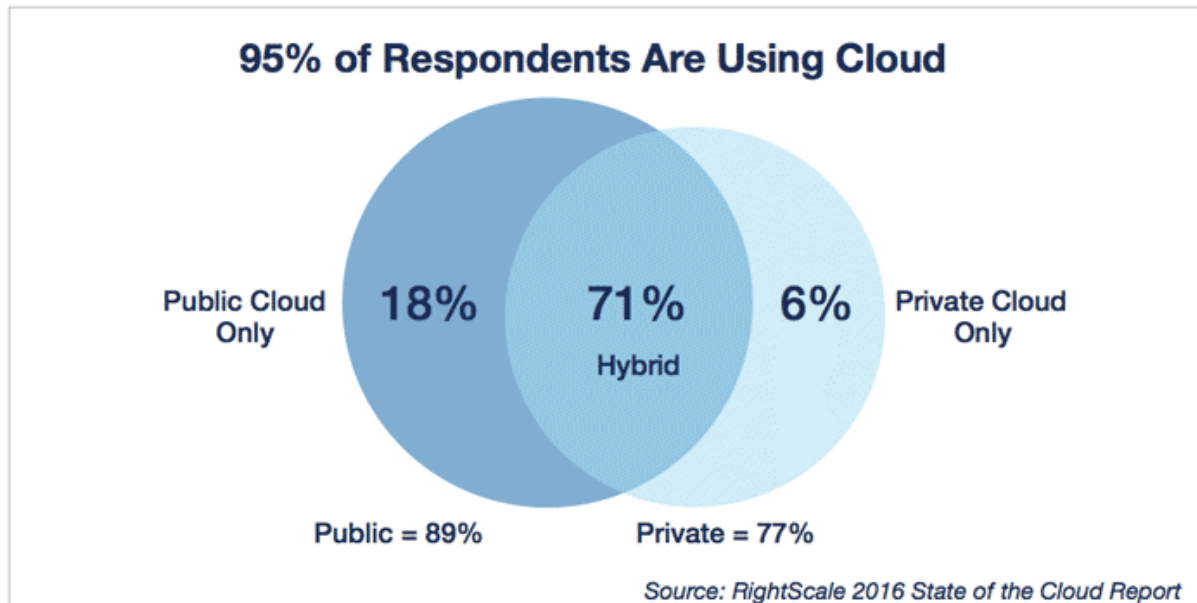
3 The methodology

The research methodology is based on various data collection from scientific articles in cloud computing research domain, books and other sources from Eurostat European Statistics Agency.

4 Data analysing and case studies

As shown in (Weins 2016), in their research cloud computing trends: in 2016 they researched the cloud computing area, in january 2016 they surveid 1060 IT professionals about their adoption of loud infrastructure and related technologies, 43% of respondents represent organizations with more than 1000 employees. The 95% of respondents are using the cloud technology as shown in figure 3

Figure 3 Cloud computing usage



Adopted from Right scale report

Regional Government in Spain

(Macias F. 2011) The regional government of Castilla-La Mancha (autonomous community of Spain) has developed a cloud strategy to advance the usage of e-government applications for taxes, pensions and drivers licenses, and also support online education and virtual classrooms where teachers and students can be able to share, use and upload different useful materials and informations. With this platform the number of physical data centers is reduced from 48 to 2, and potential savings of Castilla-La Mancha are 400.000 euros. District Police Force in England. The police force which is responsible for six southwestern England districts - Gloucestershire Constabulary. In order to lower costs and increase efficiency they use the new cloud computing approach for higher levels of automation and integration. With help of the embed of smart meter technology, Gloucestershire Constabulary reduced the power requirements, reduced the file server requirements by centralizing storage and domain access to a smaller number of sites and reduced the number of physical machines from 200 to 2 chassis. The Municipal Government in the Paris Suburbs Community of Municipalities of the Bourget Airport, one of the three of the municipal governments in Paris suburbs, virtualized their 27 physical servers and 1000 desktop computers. Storage requirements are reduced to minimum, by storing just changes made by users with the help of linked clone deployment. David Larose states that, with the help of this linked cloud technology, 6 terabytes SAN are enough for their needs.

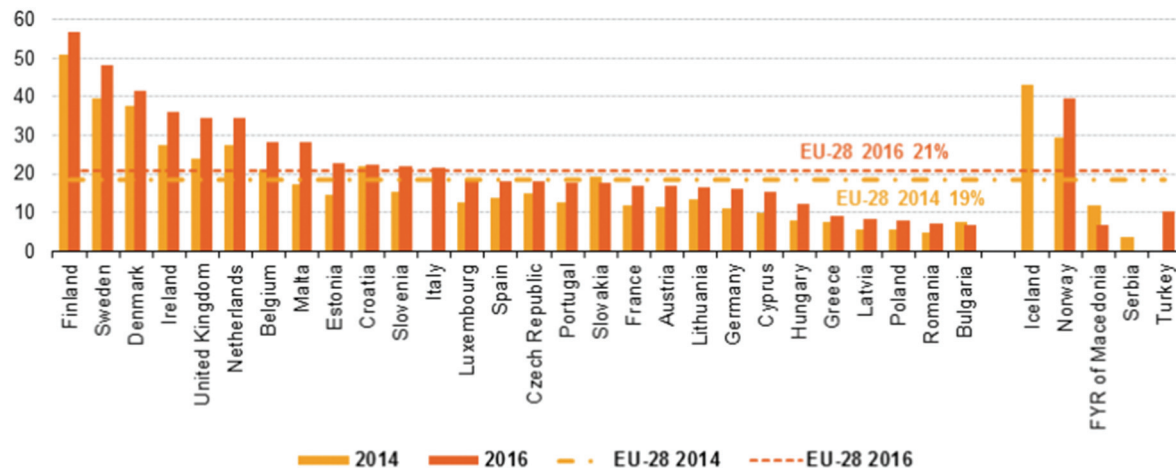
The IT Department of the State of New Mexico created a cloud that supports international and citizen-facing applications offering the entire applications base for the state's agencies. In this way the state saves money, energy and space. The IT team changing? carrying the for the services, created a revenue stream which is used for keeping the technology up to date. In essence, they have become a leading-edge service provider within the government.

The USA governments IT budget is 75 billion dollars, approximately 52 billions euros. The government's official website portal, has been moved to the cloud, provided by the Enterprise Cloud, by the Terramark company. The USA Government websites are the busiest with approximately 100 million visitors per day. Before the cloud, when the online traffic peak occurred, there were long delays and the users suffered also from downtime. The duration of data transfer was done only for 10 days. As a result of this cloud platform adoption, it succeeded in reducing the costs and improving the

performance. Comparing with the old system, the new technology cut costs by 90% and in the same times it improved the performance and flexibility.

(Y. 2011)In the United Kingdom, the annual IT budget of the government is approximately 18 billion euros. The UK Chancellor of the Exchequer, George Osborne, introduced the 9 points Spending Review for all the government departments, cutting the spending costs by 20%.

Figure 4 Use of cloud computing services 2014-2016



Adopted from (GIANNAKOURIS 2016)

As we can see on the report figure 4 adopted from Eurostat European Statistics Agency the usage of cloud computing technology in Romania is less than 10%, growing from 2016, but still very low compared to Finland, Sweden etc., where cloud implementation is more than 50%.

Hypothesis of the study:

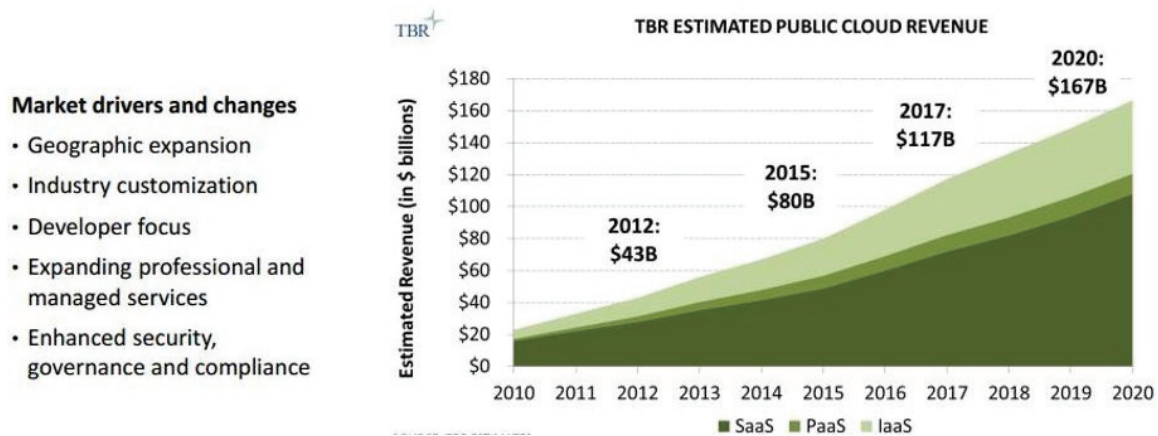
H1: Cloud computing services are cheaper than traditional systems?

If we measure the results of the Regional Government in Spain, the regional government of Castilla-La Mancha, we notice that they reduced their costs by 400 000 euros by implementing cloud computing technology. Also the Municipal Government in the Paris Suburbs Community of Municipalities of the Bourget Airport, one of the three municipal governments in Paris suburbs, virtualized their 27 physical servers and 1000 desktop computers. Storage requirement is reduced to minimum, storing just changes made by users with the help of linked clone deployment. According to the studies, we confirm that the cloud computing technology is cheaper than the traditional system or software.

H2: Is Cloud computing technology applicable in the public sector?

According the studies above, the cloud computing services can also be implemented in public sector services. Following the United Kingdom and the United States models, and comparing their results we can see the efficiency of cloud computing technology.

Figure 3 Cloud computing revenue



Adopted from (Columbus 2016)

If we analyze the research in Figure 4 we can observe that the cloud computing services are growing so fast and in 2017 they reached a revenue of 117 billions dollars. In 2012 the cloud computing market was 43 billions dollars and TBR predicted that cloud IT spending will increase from 80\$ billions in 2015 to \$167B in 2020. (Columbus 2016)

According to (InvestRomania 2016), Bucharest Romania IT&C sector is considered a primary growth driver with an increase of 9% and forecasts are that by 2020 it will be worth 4 billion euros. Global companies such as Amazon, Oracle, IBM etc. are leveraging the potential for development of Romania.

As shown in the (UTI 2015), UTI was the first company that has implemented the first national cloud computing platform in Romania. UTI has finalized the Cloud Infrastructure for Public Institutions in Romania for Informatics Research-Development National Institute in Bucharest financed through UE Structural Funds within the Increase of Economic Growth Sector Operational Program.

4 Conclusions and remarks

This paper provides many examples of successful cloud computing implementation models of cloud computing technology in public sectors, which can be used as an example for improving Romania's public sector services. We are trying to create a model for the implementation of cloud computing technology, combining strategy and change management. The cloud computing approach is an important strategy component in many organizations, not only for public organizations as e-governance, education public services and healthcare strategies. Cloud implementation can considerably benefit the public sector organizations by: Controlling and reducing costs, optimizing human capital, consolidating facilities, efficiently using its assets, improving adaptability and agility by virtualizing resources and increasing the capacity with simple scalability.

According to our research the Cloud Computing implementation improves the public sector services and this article is only the beginning of the research for improving the Romanian public services. If we follow the reports in our research we can see that Romania is one of the countries that lack of use of cloud computing technology. The Romanian public sector is reorganizing their governmental agencies in Bucharest and this is the right moment to start implementing the cloud computing services

References

- Ajzen, I. "The theory of planned behavior." 179-211. 1991.
- Becker, B.E., Huselid, M.A., Ulrich, D. *The HR Scorecard: Linking People, Strategy, and Performance*. Boston: Harvard Business School Press, 2001.
- Beckhard, R., Harris, R. *Organizational Transitions: Managing Complex Change*. Addison-Wesley Publishing Company, 1987.
- Bryson J. M. *Strategic Planning for Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievemen*. Jossey-Bass, 2011.
- Bryson, John M. *Strategic Planning for Public and Nonprofit Organizations: A guide to strengthening and sustaining organizational achievement*. 2011.
- Burke, W.W. *Organization Change: Theory and Practice*. Sage, 2002.
- . *Organization Development: Principles and Practices*. Boston: MA, 1982.
- Collins, J.C. and Porras, J.I. *Built to Last: Successful Habits of Visionary Companies*. New York: HarperCollins Business, 1997.
- Columbus, L. *Roundup Of Cloud Computing Forecasts And Market Estimates, 2016*. TBR, 2016.
- Concepts, Management. *Successful Change Management Practices in the Public Sector*. 2016. <file:///C:/Users/MK%20SMART%20COMPANY/Downloads/sponsored-change-management-practices.pdf> (accessed 07 04, 2017).
- Desmidt., Heene. "Transforming public organisations with strategic management and strategic leadership." *Journal of Management*, 2005.
- Eisenhower, D. *Remarks at the National Defense Executive Reserve Conference*. 1957.
- Fitz-enz, J. *The ROI of Human Capital: Measuring the Economic Value of Employee Performance*. New York: AMACOM, 2000.
- GIANNAKOURIS, K., SMIHILY, M. *Cloud computing - statistics on the use by enterprises*. Eurostat, 2016.
- Gilbert, C. and Bower, J.L. *Disruptive change: when trying hard is part of the problem*. Harvard Business Review, 2002.
- Hammer, M. and Champy, J. *Reengineering the Corporation: A Manifesto for Business Revolution*. New York: HarperBusiness, 1993.
- Herman, S.M. "The Organization as an Iceberg." *Proceedings of Organizational Development Network Conference*, Chicago, IL.
- IBM Cloud. 2017. <https://www.ibm.com/cloud-computing/learn-more/about-cloud/> (accessed 10 01, 2017).
- InvestRomania. *IT&C Market size*. 2016. <http://investromania.gov.ro/web/business-in-romania/itc/> (accessed 09 08, 2017).
- Kaplan, R.W. and Norton, D.P. *How to implement a new strategy without disrupting your organization*. Harvard Business Review, 2006.
- Lewin, K. *Quasi-stationary social equilibria and the problem of permanent change*. New York, 1969.
- Macias F., Thomas G. "Cloud Computing Advantages." 2011.
- Marston S., Li Z., Bandyopadhyay S., Zhang J., Ghalsasi A. "Cloud computing – The business perspective. *Decision Supp Sys*." 176-189. 2011.
- Mintzberg, H. *The Rise and Fall of Strategic Planning*. New York: Free Press, 1994.
- Nag, R., Hambrick, D. C., Chen, M.-J. "Strategic Management Journal? Inductive derivation of a consensus definition of the field." *JSTOR*, 07 2007: 935-955.
- NIST. *NIST Cloud Computing Program - NCCP*. 13 07 2017. <https://www.nist.gov/programs-projects/nist-cloud-computing-program-nccp> (accessed 09 09, 2017).
- P., Christy. *Gartner Identifies the Top 10 Strategic Technologies for 2011*. 19 10 2010. www.gartner.com/it/page.jsp?id=1454221 (accessed 09 10, 2017).
- Peters, T., Waterman, R. *In Search of Excellence: Lessons from America's Best Run Companies*. New York: Warner Books, 1982.

- Poister T. H. *“The Future of Strategic Planning in the Public Sector: Linking Strategic Management and Performance.”* 2010.
- Poister, T.H. and Streib, G. *Performance Measurement in Municipal Government: Assessing the State of the Practice.* 1999.
- PROSCI. n.d. <https://www.prosci.com/change-management/what-is-change-management> (accessed 08 01, 2017).
- Schaffer, R.H., Thompson, H.A. *Successful change programs begin with results.* Harvard Business Review, 1992.
- Schubert. L, Keith. J. *Research in Future Cloud Computing.* 2012. <http://cordis.europa.eu/fp7/ict/ssai/docs/future-cc-2may-finalreport-experts.pdf> (accessed 08 09, 2017).
- Ulrich, D. *A new mandate for human resources.* Harvard Business Review, 1998.
- UTI. *UTI has implemented the first national Cloud Computing platform.* 07 12 2015. <http://www.uti.eu.com/news/uti-implemented-first-national-cloud-computing-platform/> (accessed 08 08, 2017).
- Wagar, T.H. “Do HRM practices and policies matter? That survey says ...” *The HRM Research Quarterly*, 1999: 1-4.
- Weins, Kim. *CLOUD MANAGEMENT BLOG.* 09 02 2016. <https://www.rightscale.com/blog/cloud-industry-insights/cloud-computing-trends-2016-state-cloud-survey> (accessed 08 10, 2017).
- Y., Tuomas. *CLOUD COMPUTING IN THE ICT OF FINNISH.* University of Applied Sciences, 2011.