CLOUD COMPUTING FOR SMALL AND MEDIUM ENTERPRISES – A STRATEGIC OPTION UNDER GLOBALIZATION

Raluca Ecaterina BRANDABUR, PhD Lecturer,
Academy of Economic Studies Bucharest,
Marketing Department

Cloud computing will be next blockbuster on the technological front, but it's also one that many businesses approach with skepticism. Over the last few years, the hype about cloud computing has escalated enormously, while in reality, only about 20 percent of businesses have incorporated a cloud model into their business strategy according to a survey conducted in 2010 by IBM — the IBM 2010 Global Risk Survey.

The idea behind cloud computing is that anybody need not own all the software and hardware necessary to run a business. An enterprise can rent it and pay it per use.

It has the potential to revolutionize the way we see and do business by providing clear economic incentives. While the challenges and risks are real, cloud computing also has the potential not only to cut IT costs dramatically but even to transform how business is conducted.

Present paper propose to explain how usage of cloud computing paradigm can be a real strategy for medium and small enterprises in order to survive to the dramatic and powerful changes imposed by globalization.

***Key words**: SME, globalization, cloud computing, strategy, cost reducing.*

Introduction

In the actual global economic context, the most affected companies are the Small and Medium Businesses Enterprises (SMEs). Already being under the competition's pressure, most of the time being an unfair one coming from the major global players, the small local companies are put in a position to reduce their costs dramatically and permanently seeking niches that allow survival.

Dependent on the large retailers, insignificant in comparison with the world class competitors or simply subcontractors for international players, the SMEs rarely afford their own development based on a professional and effective management plan. The solution to this issue is rather one of survival. The reason is relatively simple, the access to highly qualified personnel in this field, even in the form of consultancy services is difficult. Added to this is the reduced access to the latest technologies, financial funds and infrastructure.

1. SME strategy

In our opinion, SMEs do not need less than large companies to be well targeted strategically. Strategic planning allows organizations to make fundamental decisions that guide them to a developed vision of the future.

Strategic planning involves developing plans for a business and implementing and evaluating these plans.

But rarely a SME acts following the steps presented in Figure 1. Such an approach of business planning process is a characteristic of large enterprises.

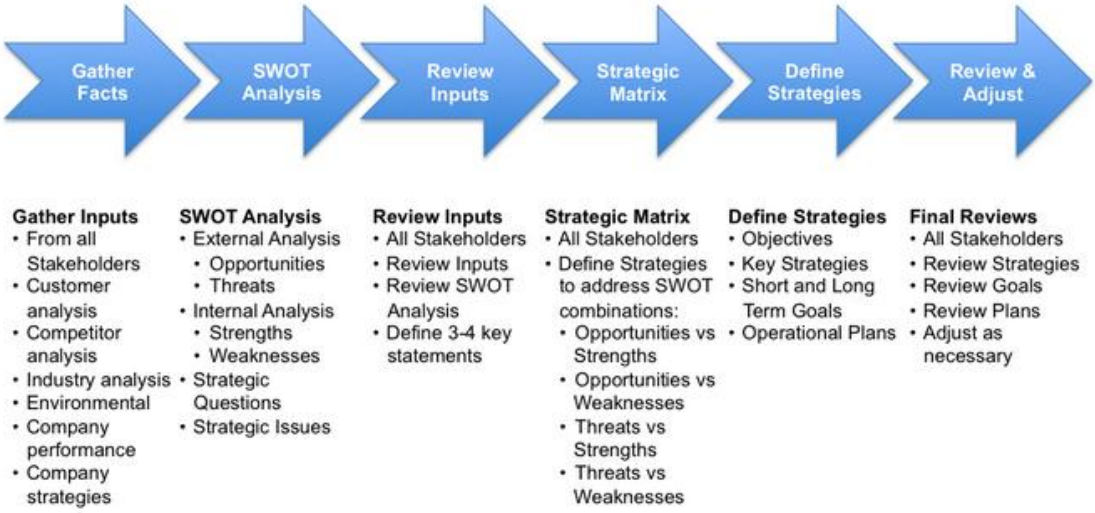

Fig. 1. Formal strategic plan process

Source: [18].

While in large companies the strategies are usually explicitly stated and documented [10; 11] (see Figure 1), in SMEs the strategies are often informal and implied from management activities and decisions [4; 17], following a pattern that we can see into Figure 2.

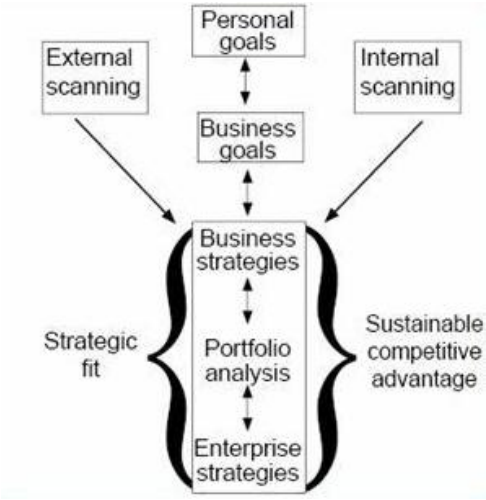

Fig. 2. Strategic plan process

Source: [6].

Whole analyze process is done be the owner himself – often without scientific management foundation, only with personal business experience, seldom put into a written form and almost always the business goals are subordinated to the personal goals.

Strategic planning is an essential functional area or dimension of business strategy. However, an extensive review of the literature shows that research on the impact of strategic planning on SME success is inconclusive, some papers show a positive impact of strategic planning on SME success and some show a negative impact [25].

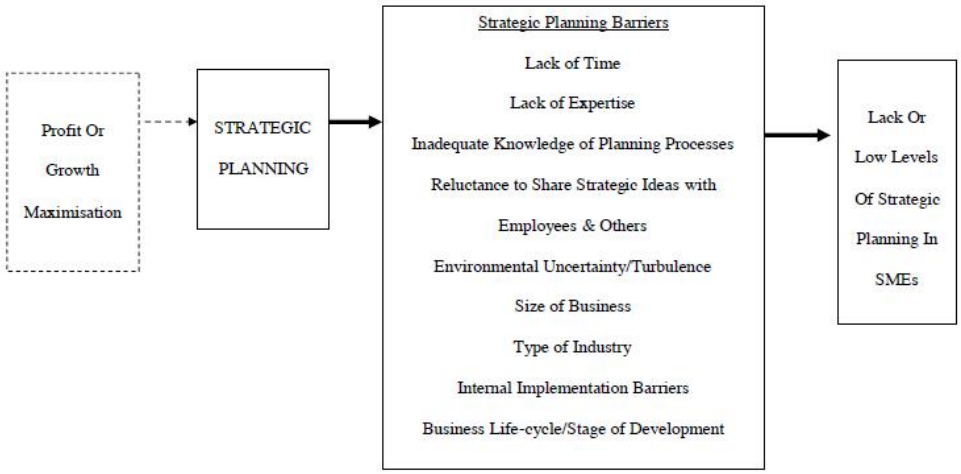

Fig. 3. Extant Approach to Explain Lack or Low Levels of Strategic Planning in SMEs

Source: [26].

An overview of specific researches [16;22; 12; 28; 23; 21] identifies a large number of factors that are solid explanations for lack or low strategic planning in SMEs, e.g.: lack of time, lack of specialized expertise, inadequate knowledge of the planning processes, or a reluctance to share strategic plans with employees and external consultants is detrimental to and compromise strategic planning in small business environmental uncertainty or turbulence, size of business, type of industry, internal implementation barriers and business life-cycle/stage of development.

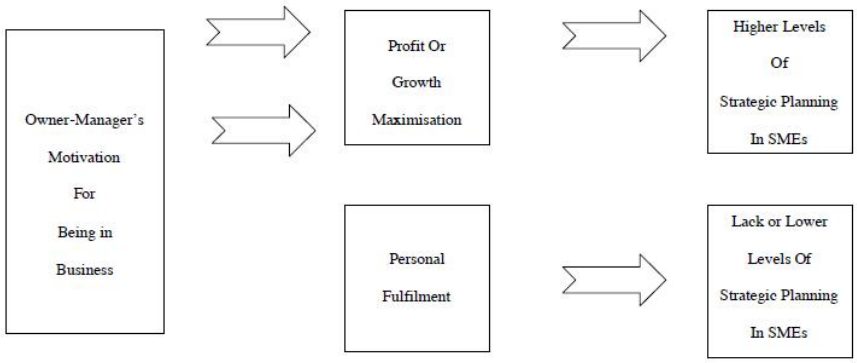

Fig. 4. Proposed Approach to Explain Lack or Low Levels of Strategic Planning in SMEs

Source: [26].

The result of this research was modeled by Wang, Walker & Redmond into Figure 3 that shows that strategic planning is hampered by various barriers to planning which result in (and explain) the lack or low levels of strategic planning observed in the majority of SMEs.

Wang, Walker & Redmond proposal, Figure 4, illustrates this conceptual relationship between the business ownership aspirations and the level of strategic planning in SMEs and argues that most SMEs do not strategically plan because the majority of owner- managers do not pursue profit/growth maximizing goals and therefore, do not perceive the need to plan to any great extent, least of all at a strategic level.

At OECD Conference for Ministers responsible for SMEs and Industry Ministers [15] were identified some of the main strategies SMEs have pursued on their own, including:

- The innovation strategy, in which SMEs try to appropriate returns from their knowledge base (which may or may not involve own investments in R&D).
- The information technology strategy, which makes innovative use of information technology in order to reduce SME costs and increase productivity.
- The niche strategy, in which SMEs choose to become sophisticated global players in a narrow product line.
- The network strategy, in which SMEs work and cooperate with other companies, being SMEs or large enterprises, in order to improve their ability to access and absorb innovations.
- The cluster strategy, in which SMEs are located in close proximity to competitors in order to take advantage of knowledge spill-overs, especially in the early stages of the industrial life-cycle.
- The foreign direct investment strategy, in which SMEs exploit firm-specific ownership advantages abroad.
- Each of these may be a competitive strategy for a SME. According Porter, a competitive strategy means to choose deliberately a different set of activities to deliver a mix of value [19].

To make the right decisions, the strategic planning process must focus on understanding the underlying modeling assumptions more thoroughly. However, SMEs must demonstrate commitment, capability and discipline to generate, preserve and analyse data which is essential for continuous monitoring and adapting creatively their strategy implementation process.

2. Cloud Computing era

The term "Cloud Computing" was introduced for the first time in 2007 when Google together with IBM [5] have founded an academic research project which allowed students from various universities to use their data-centers to solve tasks that require a large quantity of computation power. Since that moment, many other entities, academic or commercial, have contributed to the development of this model, and today Cloud Computing is a metaphor from which we understand a way to access a computer network in which the resources could be allocated or de-allocated dynamically, at request, and the costs strictly refers to the used resource (CPU cycles or storage capacity).

Based on the offered services boundary, we can distinguish two important categories of Cloud: Public Cloud and Private Cloud, or Enterprise Cloud. There are also another two less used categories called Hybrid Cloud, which shares resources between Public Cloud and Private Cloud through a secured network (Amazon's Virtual Private Cloud [2]) and Community Cloud which is controlled and used by a group of organization with same interest, but these categories are not very common in the daily based Cloud utilization.

2.1. Public Cloud

This is the most common type of Cloud, represented by Google (AppEngine), Microsoft (Azure) and Amazon (EC2, S3, etc). Of course, they are many others providers of public cloud services, but these are the biggest players on the Cloud Computing market. The access in their datacenters is made using a pay-as-you-go payment scheme. The term "public" could lead to some misunderstandings. It doesn't necessary mean that the access if for free. Some services could be free, some are to be

paid. Also the term "public" does not mean that the data in the Cloud is public.An attempt to define the Public Cloud was made by McKinsey & Co.[3] :

Clouds are hardware-based services offering compute, network and storage capacity where:

1. Hardware management is highly abstracted from the buyer;
2. Buyers incur infrastructure costs as variable OPEX (OPerational EXpenditure);
3. Infrastructure capacity if highly elastic (up or down).

The public cloud management is realized by the cloud provider, the infrastructure could grow up and down elastically and maybe not at least, the hardware issues are not interesting for the client. A higher level of hardware utilization could be achieved using virtualization. The access in the Cloud is made through the internet. One of the hottest point for embracing the Public Cloud on a large scale is the concern regarding the security and privacy. There are many debates on this theme, storing the companies data outside of their server is a sensible point. There are also some geopolitical issues due to the fact that some sensitive data are stored in data-centers located in other countries, storage that could infringe some existing laws. Companies haven't any control to the Public Cloud provider, so clear policies should exist between both parts. However, the Public Cloud providers are making serious efforts to improve security and privacy and sometimes these efforts are considerably greater than those made in the individual companies. To avoid the geopolitical issues, today it is possible to mark the stored data to be immutable on other datacenters.

International Data Corporation (IDC) – the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets, call public IT cloud services as those offerings designed for, and commercially offered to, a largely unrestricted marketplace of potential users. [9]

2.2. Private Cloud

If the Public Cloud focuses mainly on resources optimization and lowering the costs, the Private Cloud also brings together services crucial for the good functioning of the enterprise. The hardware infrastructure is this time the ownership of the enterprise, so its management. The infrastructure's issues will be solved by the enterprise and the expenses are expected to be higher than in the Public Cloud. The data is under enterprise's control in its own data-centers, and the access in the cloud is made mainly via intranet, but also internet is sometimes a common situation. The software platform is tailored to the enterprise's exact needs, the level of collaboration between the application is high, very often the data is reused as much as possible. The concerns about security and privacy are lower than in a public cloud thanks to centralization and uniformity, also the geopolitical issues due to the fact that data is kept in it's own storage locations.

2.3. Hybrid Cloud

There are situations when a company needs to interconnect its own infrastructure with the one existing in the Cloud. This could be done through a Virtual Private Nework which makes a bridge between the on-premise hardware and isolated resources in the Cloud. For example, Amazon Virtual Private Cloud allows the extension of the existing services like DNS, LDAP, Active Directory, firewalls or intrusion detection to include the Amazon Web Services resources and manage them in the same way and with the same tools as those used for local management.

2.4. Community Cloud

This kind of Cloud is used in common by a community of organizations or companies that have the same interests or same mission. They share the access to the

data, application or resources in the Cloud and it is somehow similar with the Grid, but the resources provisioning follows the elasticity principle.

Overall, it is important to understand that cloud computing is not a one-size-fits-all solution. Each type of cloud has his own benefits and disadvantages.

3. IT cost savings – a strategy for SME's

Once more, during the economic crisis period, SMEs must re-evaluate business processes, being in the position to address their support and operations infrastructures, including IT.

In companies, IT features belong to Informational System (IS). Often, for SMEs, IS is an almost unknown term and IT means only extra-costs, but IT in business is today at a key point of its evolution. SMEs use IT because they gather, manage and use information inside the organization, mainly must store and protect critical data – often customer data. Data is determinant for most of the SMEs, this is why backup and protection of their data being essential. So, a fundamental need for the SMEs is to develop diagnosis and interpretation skills around their own organizational reality, to really understand whether adopting an adequate IT solution may be a true opportunity.

IT may be used from cost reduction to value-adding, in a cost center focused on help-desk and infrastructure. It has the potential to become a strategic topic creating value and conferring a competitive advantage to business.

Cost is generated by performing activities, and cost advantage arises from performing particular activities more efficiently than competitors [19]

No business or organization can survive without a 24x7 presence on the Internet. Today, the biggest technology opportunity for companies is to reduce their total expenses through targeted IT investments that are converted from sunk capital models to variable cost operating models. [carte cloud]. Such an opportunity is Cloud computing usage due cloud characteristics, that distinguishes from the others like Grid Computing, Global Computing or Internet Computing [27] :

- *User-centric interfaces.* The access in the Cloud is meant to be as simple as the access to the other utilities (water, gas, electricity, phone) is. The beneficiary of the Cloud could continue to use its operating system, programming language or compiler unlike the beneficiary of a Grid which has to learn new shell commands and a new programming API. The software client that should be installed locally to connect to the cloud is lightweight and sometimes only a browser is needed to connect and use SaaS applications.

- *On-demand provisioning***.** In the Cloud, the resources and services are provisioned on-demand. Later the environment could be customized and personalized, software stack could be modified if the user has administrative privileges;

- *The Cloud is Autonomous***.** The Cloud system is autonomous and it is managed in a completely transparent manner for the final user. The hardware and the software inside the Cloud is permanently reconfigured and orchestrated to present a single entity that is finally rendered to the user.

- *Guaranteed Quality of Service.* The Cloud providers offer to the users services with a certain level of quality of services, I/O bandwidth and memory size, data storage space, etc. This level of quality of services is rendered by processing the Service Level Agreement (SLA) with the users, which specifies the availability, performance, operation, billing prices and methods and penalties in case of SLA violation.

- *Scalability and flexibility.* This is one of the most important characteristics of the Cloud, the offered services and platform could scale geographically, and remains also flexible to adapt to the beneficiary's various requirements and needs and also the potentially very large number of users.

Without a doubt, cloud computing is the newest cost-strategy finding, with its ability to reduce IT costs, increase agility, free up IT resources, and help SMEs to stay at the forefront of technology.

First of all, various cloud services offers, allow SMEs to translate significant capital expenditures into lower ongoing operating costs. Figure 5 depicts other advantages and benefits of using Cloud computing for SMEs.

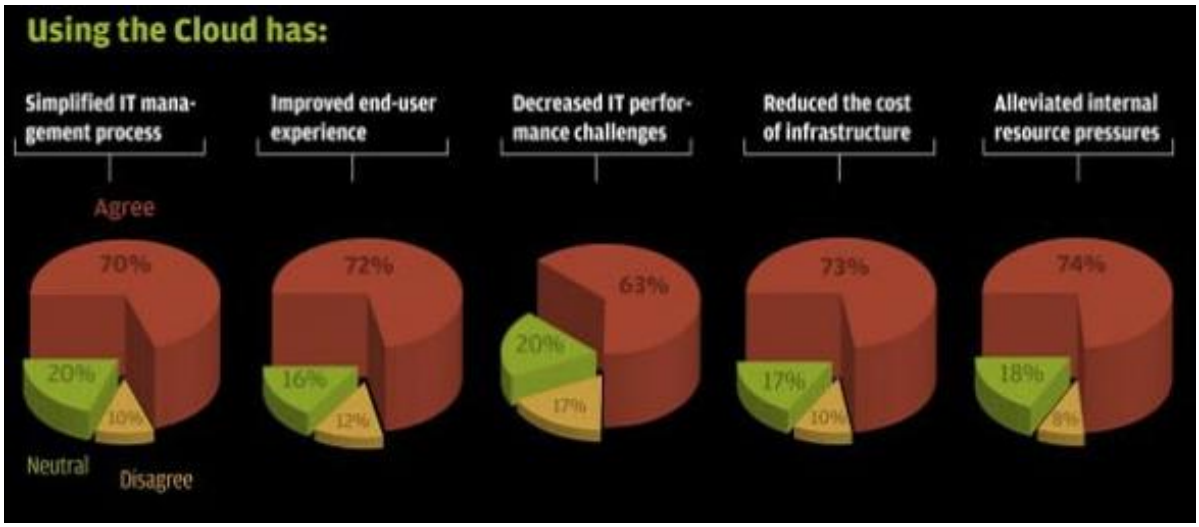

Fig. 5. Benefits of Cloud Usage

Source: [7].

An recent IDC research [9] revealed significant improvement, in terms of simplification of IT management process, improvement of end-user experience, decrease of IT performance challenges, the cost of infrastructure reducement and internal resource alleviation, in terms of more than 70% – per each attribute, for cloud computing usage in a company.

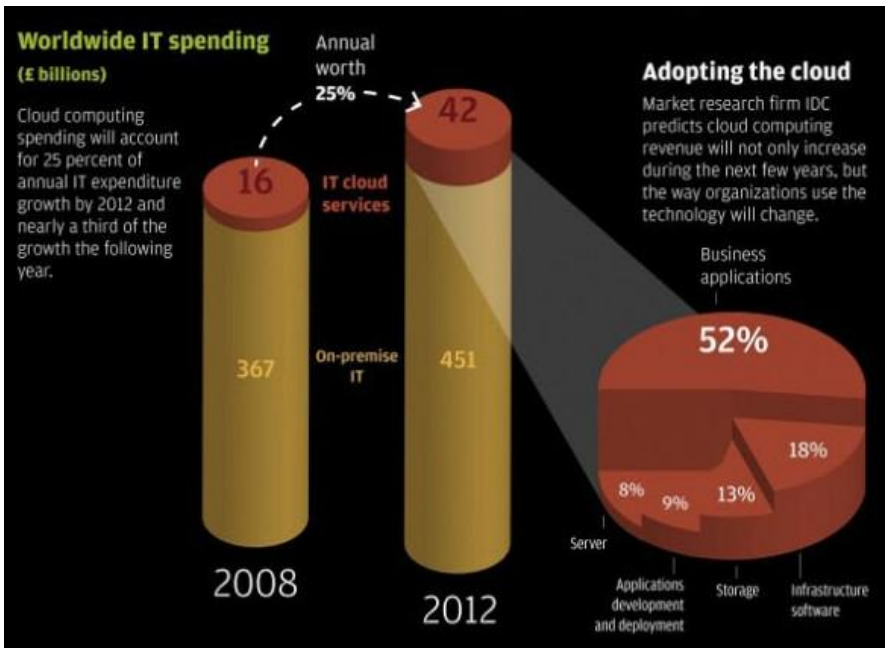

Fig. 6. Stats on Cloud Computing

Source: [7].

Such results, obtained from business practice, may offer the needed support to our main proposal: cloud computing usage may generate huge benefits for SMEs, offering them the possibility to concentrate on their core competencies. Cloud platforms and services will also allow many small companies associate and collaborate in order to compete more effectively with larger competitors.

In fact, IDC predicts that "spending on cloud computing will capture 25% of IT spending growth in 2012 and nearly a third of growth in 2013" [13], see Figure 6.

According Moyse [14], the top 5 cloud developments, in the next few years, for SMEs will be:

- Simplification of cloud services in terms of package and pricing to the mass market customer.
- Standards and bodies will continue to grow in importance, providing customers a reference point to assist in their understanding and safe adoption of cloud platforms.
- Increase in Cloud Aggregation Resellers, cloud specialists who will assist the smaller business with advice, support and even run their cloud IT for them.
- More education – both in terms of certification and training available – to fulfil a growing requirement for cloud education and information.
- New Cloud applications will appear without the brand name that smaller companies will find more affordable and palatable to adopt, having no corporate standards to overcome and less re-training costs or risks of an enterprise customer making the same change.

By 2016, public IT cloud services will account for 16% of IT revenue in five key technology categories: applications, system infrastructure software, platform as a service (PaaS), servers, and basic storage. More significantly, cloud services will generate 41% of all growth in these categories by 2016. "Quite simply, vendor failure in cloud services will mean stagnation," [9]. The forecast does not include revenue from private cloud deployments, which are dedicated to a specific customer. While private clouds provide the customer with the ability to specify access limitations and the level of resource dedication beyond what is currently available in public cloud offerings, IDC's expectation is that public clouds will mature and eventually incorporate many of the capabilities (particularly security and availability) that make private clouds an attractive option today.

Public cloud and private cloud are two possible solutions for SMEs to migrate their infrastructure and applications from on-premise locations, but every of these solutions come with a set of benefits and disadvantages. Choosing between them is a matter of carefully analysis not only thinking in economic terms but taking into account security and functional issues.

Smaller organisations will find it hard to deploy private cds. SMEs have limited or not dedicated IT staff and no time or resources to set up the virtualization, automation, storage, and networking technologies to create and support their own a private cloud solution.

Under these conditions, only public cloud solution is available, under a pay-as-you-go (PAYG) system, where clients pay only for the quantity of services consumed. So organisation's IT infrastructure is capable of being moved to an alternative IT provisioning resource through distributed systems and parallel computing to enable the same level of service using internet based interfaces. The use of public cloud services is creeping up on us by stealth and definitely save money, and allow SMBs to have applications they normally could not afford

According Copie [1] "security is the most important concern that prevents SMEs to fully adopt Cloud

Computing", but implementing a correct and consistent set of security policies together with following a well defined application developing practices could overcome the security concerns and provide a safe environment for SMEs data. There are applications like Hosted Exchange or CRM that accommodate well in the public cloud but in the same time this environment is not always the best solution for SME's clients when it comes to infrastructure. The public cloud could be an alternative for backup solutions in case of disasters and a possible target for many SMEs which still wait for technology maturation before moving to the cloud.

4. Future work

The author proposes to study the degree of acceptance of cloud computing solution in Romania into B2B (business/organizational) market and furthermore the degree of developing of IT outsourcing strategies.

5. Conclusions and recommendations

With cloud, instead of SMEs operating workloads such as desktops, storage and communications through physical in-house servers, they are hosted on centralised virtual servers in a data centre which means the cost of investments is more affordable; the deployment and set-up times are rapid and less complicated than traditional configurations and the provided solutions are more scalable, secure, and agile [24]

For a better strategy implementation of cloud computing into small businesses, the SMEs must share information, national experiences and technical know-how, disseminate information on best practices, data-collection, networking and ask for technical assistance for projects, training activities, and for a coordination of the activities with other organizations, governmental or not, active in this field.

On the other hand simply trying to survive on different markets, through developing various managerial strategies is not enough. The real solution is the creation of impartial rules through regulation and institutional reform, eliminating barriers that restrain the SMEs development.

References

1. Copie A., Fortis T.F., Munteanu V.I., Data security perspectives in the framework of Cloud Governance for lifecycle support, presented paper at Workshop on Big Data Management in Clouds, Rhodes Island, Greece, August 27, 2012
2. Extend Your IT Infrastructure with Amazon Virtual Private Cloud, http://awsmedia.s3.amazonaws.com/Extend_your_IT_infrastructure_with_Amazon_VPC.pdf
3. Forrest, W.: McKinsey & Co. Report: Clearing the Air on Cloud Computing (2009), http://uptimeinstitute.org/images/stories/McKinsey_Report_Cloud_Computing/
4. Gibcus, P., and R. Kemp, R., Strategy and Small Firm Performance. Zoetermeer, Netherlands: EIM Publisher, 2003
5. Google and I.B.M. Join in 'Cloud Computing' Research [URL] http://www.nytimes.com/2007/10/08/technology/08cloud.html?_r=2&ex =1349496000 &en= 92627f0f65ea0d75&ei=5090&partner=rssuserland&emc=rss&oref=slogin
6. Hofstrand D., Strategic planning for value-added farm businesses, http://www.agmrc.org/business_development/strategy_and_analysis/articles/strategic-planning-for-value-added-farm-businesses
7. http://www.awwwards.com/gallery/55005/29
8. Hugos M. and Hulitzky D., Business in the Cloud: What Every Business Needs to Know About Cloud Computing, John Wiley & Sons, Inc., Hoboken, New Jersey, 2011
9. IDC, http://www.idc.com/prodserv/idc_cloud.jsp
10. Johnson, G. and Scholes, K., Exploring Corporate Strategy, Harlow: Prentice Hall, 2002
11. Lynch, R. (2000). Corporate Strategy. Harlow England: Prentice Hall, 2000

12. Matthews, CH & Scott, SG 1995, 'Uncertainty and Planning in Small and Entrepreneurial Firms: An Empirical Assessment', Journal of Small Business Management, 33 (4), 34-52
13. Montalbano, E., IDC: Economic Crisis to Bolster Cloud Computing," IDG News Service, October 20, 2008 (http://www.cio.com/article/455568/IDC_Economic_Crisis_ to_Bolster _ Cloud_ Computing?page=1).
14. Moyse I., Top Trends In Cloud Computing For SMEs, http://www.cloudtweaks.com/2012/06/top-trends-in-cloud-computing-for-smes/
15. OECD, Enhancing the Competitiveness of SMEs through Innovation, Conference for Ministers responsible for SMEs and Industry Ministers Bologna, Italy, 14-15 June 2000
16. O'Regan, N & Ghobadian, A 2002, 'Effective Strategic Planning in Small and Medium Sized Firms', Management Decision, 40 (7), 663-671
17. Pearce, J. and R. Robinson, Strategic Management: Strategy Formulation and Implementation, Homewood, IL: Richard D. Irwin Inc, 1985
18. Philip M., Fullproof Strategic Planning Process for New or Growing Businesses, http://www.free-press- release.com/news-fullproof-strategic-planning-process-for-new-or-growing-businesses-1299504075.html
19. Porter M, What is strategy, Harward Business Review, november-december 1996, 58-78
20. Robinson, RB & Pearce, JA 1984, 'Research Thrusts in Small Firm Strategic Planning', Academy of Management, 9 (1), 128-13
21. Sexton, DL & van Auken, P 1985, 'A Longitudinal Study of Small Business Strategic Planning', Journal of Small Business Management, 23, 7-15
22. Shrader, CB, Mulford, CL & Blackburn, VL 1989, 'Strategic and Operational Planning, Uncertainty and Performance in Small Firms', Journal of Small Business Management, 27 (4), 45-60
23. Stonehouse, G & Pemberton, J 2002, 'Strategic Planning in SMEs – Some Empirical Findings',Management Decision, 40 (9), 853-861
24. The Open Group, Maximizing the Value of Cloud for Small-Medium Enterprises, April 2012
25. Veskaisri K., Chan P.,Pollard D., Relationship Between Strategic Planning and SME Success: Empirical Evidence from Thailand, International DSI / Asia and Pacific DSI 2007 Full Paper, July, 2007,
26. Wang C., Walker E.A. & Redmond J., Explaining the Lack of Strategic Planning in SMEs: The Importance of Owner Motivation, International Journal of Organisational Behaviour, Volume 12 (1), 1-16;
27. Wang l., von Laszewski G., Kunze M. and Tao j., Cloud computing: a perspective study. New Generation Computing, Vol 28, 137-146, 2010. Ohmsha, Ltd. and Springer.
28. Yusuf, A & Saffu, K 2005, 'Planning and Performance of Small and Medium Enterprise Operators in a Country in Transition', Journal of Small Business Management, 43 (4), 480-497