Economic Empowerment through New Technology Adoption

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This article analyzes the paradigm of Cloud Computing technology adoption in current global business environment in order to optimize expenditures, cash-flows and revenues for various commercial and even non-commercial entities. The subject is treated in a holistic approach emphasizing both the investing perspective and the specific principles of project management that are employed in this area. The purpose of this article is to offer both the economic and engineering community a unified perspective regarding the current trends in business dynamics based on new technology adoption and in the same time the perspective of the application of old value investing principles in this subject.

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We all agree that good business approaches and investing ideas can be usually described in just a few words. The transition in economic environment from CAPEX (capital expenditures) oriented business support infrastructures to OPEX (operational expenditures) model

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has a simple explanation and a straight-forward approach. This transition applies to any kind of structure such as small-to-medium companies, large corporations, non-governmental organizations and public governmental institutions. To briefly describe the approach in our case OPEX is just a simple name for the new trend in business support infrastructures namely using needed infrastructure based on rental approach or the so called "as-a-service" approach. This concept is not new as it has been on the market in various forms for the past 10 years – see internet email for corporations, online accounting services, customer relationship management online databases and so on. Nevertheless only in the recent years the 1960s concept of Cloud Computing (McCarthy, J. 1960) has taken a wide spread and a clear concept form and content. Basically after many years of using the Cloud in one way or another we all agree we can't live without it. As previously stated Gmail, online stores, Yahoo– they are all part of our daily life. We all agree these technologies are revolutionizing the way we do business, no matter if you have an online business or you are just an information technology consumer. A lot of questions arise regarding concerns about safety, transparency and availability and even more answers are given by Cloud providers, software experts or just Cloud aficionados.

The big change and its impact towards business support systems is obvious and all about cutting and optimizing costs. Let us take for example the case of governmental institutions: in past 4 years and especially in past 12 months the critical issue of governmental funding, governmental budgets and all projects and investments based on those instruments has grown exponentially due to extreme budgets cuts and global economic crisis. Probably in all the time since the birth of Information Society there has not been such a critical issue as it is now the one of governmental funded investments. Now more than ever governments have to cut costs and improve efficiency. In the era of digital information improving efficiency equals making extensive use

of information technology. Nevertheless the critical need for cutting costs and accommodating smaller and smaller governmental budgets pushes Chief Information Officers to discover new solutions and new approaches. We read more and more each day about virtualization, migrating governmental systems from capital expenditure based infrastructure to hardware-licensing infrastructures delivered in the form of services. And now the simple question that the economist, the engineer and the entrepreneur must ask themselves is: why we can't continue like before? The answer is the same as the one we answered for the previous question and is straight forward: Costs!

In the following case studies will simply analyze the current status of exiting operating commercial and governmental information systems in order to further detail and understand the need for a paradigm change in the costs of business support infrastructures. No matter how many systems we analyze we will find hardware infrastructures that host software applications using only between 5% and 20% of the whole computational resources (especially in terms of processing power). Now imagine having tens of such systems using only an average of 15% of the computing power.

In order to further explain the case study we will also make a parallel with Amazon (NASDAQ: AMZN) and their Amazon AWS services. For those who do not know the case Amazon: in 2003-2004 the mentioned company was in an almost similar situation with our Romanian case regarding their own platform. That is why and how the AWS was born in late 2005 (Bort J., 2012) – all the redundant computing power infrastructure was transformed in a new business unit based on an entirely new business model – the birth of the Amazon Cloud. The business paradigm of Amazon AWS is very simple and it is based on OPEX principles: all services are billed based on usage and the way usage is measured for billing purposes varies from service to service.

However the problem with our governmental systems is unfortunately far from an Amazon AWS-like solution. These systems are implemented in the so called island-like approach (and that is fully the Romanian situation). This basically means that each system of each institution is totally independent and non-aware of other systems from other governmental institutions. As a result the 85% remaining computing power (100% minus 15% equals 85%) – and certainly the investment behind it - will go to waste without the possibility of constructing a grid-like infrastructure (Foster, 2002) and put those expensive 85% resources to work in a cloud of resources.

Now imagine what happens with the standard software packages and licenses on top of those hardware infrastructures. As anyone can imagine they become obsolete quite fast requiring more capital expenditures for upgrades. We can go even further and analyze the costs of operating this infrastructures: those unused 85% are in most cases are consuming some power (although at minimum levels), are requiring system administration, cooling and environment control, and so on.

Finally worldwide lots of private and governmental organizations are starting to migrate their business support platforms from classic infrastructures to Cloud based ones. We are observing de development of either e-business and e-government solutions based on public clouds or operating government-to-government, business-to-business systems in private Clouds. The big question behind these Cloud-platform implementations has a strong resonance: How drastic is the change for the organization both in investment implementation cycle and in post-implementation lifecycle? We have to keep in our sight that we are analyzing his critical subject in a moment when it seems that all governments and large corporations are put to the test in regard to sovereign debt, corporate debt, financial planning, expenditure management, trust.

This is the point where we start to analyze more deeply the proposed subjects: that of the parallel between new tech – namely Cloud Computing – adoption and the principles of value investing (Graham B., 1934). Further we will analyze the needs and the issues of approaching such an investment from project management perspective. The parallel between the almost 80 years old Value Investing principles and adoption of new technology – namely Cloud computing – has been done in order to provide the reader with tool and a clear approach to the "why" of adopting this paradigm of business support infrastructure technology. The project management principles presented in the last part will familiarize the reader with the specific management tasks including risk management issues of implementing such a investment.

Value Investing theory in financial world is all about maximizing profits while minimizing risks associated with investing on a medium-to-long horizon. Cloud Computing on the other hand is about using computing resources as services in a total heterogeneous approach. Apparently these are two totally different subjects that come from two different environments – financial /equity markets and information technology – and may have nothing in common however value Investing principles should be applied to Cloud computing technology adoption process and this paradigm is the main finding presented within this material.

The process of investing in a Cloud based service approach must always begin with establishing a new purchasing model for future support infrastructure investments. What needs to be done is creating a new corporate technology approach policy including special training of the employees for post-implementation technology adoption aside from normal pure engineering tasks such as analysis, architecture, implementation. The step-by-step analysis of this process of establishing a new purchasing model for future investments

determines the main principles that we employ and the cohesion between those and the basic principles of Value Investing as follows:
Step 1: First consider investment valuation from a business owner's perspective. In simple terms imagine you have already implemented the Cloud infrastructure investment within your organization and start build all your other assumptions from this point forward.
Step 2: According to Value Investing principles you should continue with the assumption that market price bears no relation to the investment's actual worth or net asset value. Basically do not think Cloud investment in terms of market value but rather in terms of corporate intrinsic value – "How much money will this investment generate for our company in next 5 years?". The actual corporate intrinsic value in our case can be calculated analyzing comparison *Table 1*.

Table 1

CAPEX vs OPEX comparison

CAPEX	OPEX
Infrastructure expenses cannot be fully deducted in the period when they were incurred. Tangible assets associated with computing power are depreciated and intangible assets such as licenses are amortized over time.	Infrastructure expenses are fully deducted in the period during which they were incurred.
Employing capital expenses for business support infrastructure determines increase in company book value due to increase in total assets value.	Transforming business process support infrastructure capital expenses in operational expenses can generate great costs cuts and certainly increase cash flow within a company. Also being able to deduct expenses reduces income tax, which is levied on net income.

Step 3: Calculating the Cloud investment's intrinsic value is more an art than an actual series of mathematical computations due to the combination of good-will elements and clear computable factors – as

it is the case with any valuation where Value Investing principles are applied. Each investment ranging from an equity investment to a cloud infrastructure has its own intrinsic value calculation method. This is the point where Cloud consultant shows his experience and expertise. We have to note that the whole point is treating a Cloud implementation as an "asset" development rather than a "liability" acquisition. In our case valuation we can calculate the intrinsic value with the following mathematical model:

T_i = the time interval we are using as reference (usually 5 to 10 years)
E_y = the yearly cost reduction value obtained after employing OPEX approach
V_f = the future value of the investment in the Cloud infrastructure
V_i = the current (intrinsic) value of the investment in the Cloud infrastructure
P_d = the depreciation percentage of the investment. In our case we can consider inflation as a reference as there is no actual depreciation of the contracted Cloud computing services or we can propose a generic value of 5%.

$$V_f = E_y \times T_i$$

$$V_i = \frac{V_f}{(1 + \frac{P_d}{100})^{T_i}}$$

Step 4: Finally determine the margin of safety and then see if the investment is sufficiently "underpriced" within the constructed methodology model of the previous step in order to make the final decision for a worthwhile investment.

V_i = the current (intrinsic) value of the investment in the Cloud infrastructure
P_i = acceptable price of the investment
V_m = *[-N..0..m*× E_y*]* - Margin of safety – basically a good-will derived value and can have a range between 0 and multiple (m) times E_y in the case of applying a discount or –*N* to 0 in the case when applying a value *N* premium.

$$P_i = V_i - V_m$$

Project Management is the critical tool needed for the implementation of this infrastructure project approach and in our case we will use a virtual case study in order to present the main tasks and issues. The virtual project case study that will be presented is based on real life implementation of a Customer Relationship Management infrastructure based on Cloud Computing approach.
First of all we should make a brief introduction in the base principles of CRM. Customer Relationship Management is a whole science by itself and that is a fact. Broken down CRM is based on economic and financial methodologies, software tools and certainly usage of the Great Internet all with the purpose of supporting a company in order to manage customer relationship in an efficient way.
Tracing back the birth of CRM we find it in 1980's when companies realized that automation of marketing and sales processes is a must (Shaw R., 1991). Later in the '90s CRM allows companies to fully interact with customers and their constantly changing expectations and so CRM is becoming very popular. Currently according to Gartner, CRM projects include traditional areas such as sales automation, management and contact centers as well as other areas such as enterprise feedback management, marketing resource management, pricing, performance management and social media.
From a holistic project management view of implementing a successful CRM strategy we define a number of basic actions that must be always taken:

employees must be trained before and after
the business processes within the software systems correlated with the customers' needs
base software and hardware infrastructure must be designed, purchased and implemented
On the other hand we are also considering in our case study the adoption of Cloud Computing technologies within the virtual organization. For every business that is activating on the local markets or the global one the Cloud represents a massive opportunity for profit growth by lowering operational costs. Nonetheless for developing a Cloud solution, a series of steps has to be followed from project management point of view:
Identifying the services that the organization needs in the Cloud (automated) – CRM in our case
Prepare to migrate the existing corporation data to the Cloud – any functioning enterprise already has a customer base, invoicing and contract data, etc.
Understand business and IT risks such as data security and privacy usually when choosing a certain Cloud solution
And finally create an exact plan and execute
Going back to the case of our specific CRM investment strategy – that of implementing a Cloud CRM – we find out that everything about Cloud CRM implementations is broken down in two potential options: the possibility that the beneficiary of the project will use a private cloud implementation and the option of using public cloud services subscription. Basically the two major directions are 100% dictated by your organization size and structure. The explanation is quite straight forward as you will see in the following paragraphs.
Let us say your organizations spans over multiple geographical areas with multiple business units, divisions, franchises and other sub-structures. In this situation you will definitely need a private cloud

implementation for you corporate CRM. This private cloud CRM implementation will have two stages:
Stage #1 will build the private cloud infrastructure either based on OPEX – Infrastructure-as-a-Service from an external provider - or based on CAPEX - you actually buy your own hardware infrastructure that will host your own private cloud. Later in the same stage the software systems and services will be deployed (and developed if needed) in the cloud environment based either on open source (Sugar CRM for example) or based on a vendor that will accommodate the licensing model.
Stage #2 will be the actual deployment of CRM services from your private cloud to each and every business unit of your large organization. Each deployment can also mean custom configuration and even small developments in order to meet the business unit local requirements. This stage will basically continue as your organization expands.
However if you are a small to medium enterprise you will certainly go for the affordable solution of adopting an OPEX approach and buying your CRM as-a-service from an online provider.
In terms of actual project management breakdown of main activities the process is based on the classic implementation lifecycle pattern:
Requirements engineering stage: Requirements engineering of the customer CRM needs based on business model and/or existing CRM procedures
Architecture engineering stage: Architecture of the business model and data flows within the future CRM services
Implementation stage: Implementation of custom business rules on the CRM generic template
Deployment stage: Deployment of the newly configured CRM virtual-system within the CRM Cloud
Needless to say the previous four steps are always fully applied in the situation when a large corporation needs a Cloud CRM solution based

on a custom CRM architecture. Such a situation will ask that in parallel with the hardware infrastructure analysis and architecture the employed experts will start the development life-cycle of the future private Cloud CRM based on the previously described steps.

Conclusions

Although it is quite clear that technology empowerment can offer great leverage to any type of organization operating on basic cost-benefit paradigm there are not many methodical models in the academic environment and neither in the commercial one that can provide us with risk free tools for technology investment approach. In this paper we have propose a holistic approach on this subject by combining two different perspectives – the pure investment theory and the practical technology project implementation methodology – in order to offer an alternative valuation and execution tool to those seeking the economic and business leverage through the use of the new Cloud Computing technology paradigm.

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