

UNIVERSITEIT GENT

FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

ACADEMIEJAAR 2009 – 2010

Software as a Service: Study and Analysis of SaaS Business Model and Innovation Ecosystems

Masterproef voorgedragen tot het bekomen van de graad van
Master in de Toegepaste Economische Wetenschappen: Handelsingenieur

**Inna Churakova
Ramilja Mikhramova**

onder leiding van

**Prof. Dr. Ir. F. Gielen
Prof. Dr. B.Clarysse**

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June 2010

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June 2010

Acknowledgments

Inna Churakova

I would like to thank the initiator and the most fervent supporter of this work, our thesis promoter Prof. PhD. Eng. Frank Gielen, who gave us this opportunity and possibility not only to discover the business potential of software, but also to taste the entrepreneurial challenge through the iBoot contest.

This work was only possible thanks to the input of multiple business and academic professionals: Filip Tersago, Dirk Schaele, Joren De Wachter, David Geens, Angelo Vella, Will Baccich, Simon Small, Rich Walker, Jeff Bell, Rudi Geiger, Mike Warren, Chris Sterbenck and Mansour Salame. All of them provided us with insights on dissimilarities between theoretical and operational practices, which constitute the fundamentals of our work.

In addition, special thanks go to my thesis partner for her straightforward and honest opinion, critical view, infinite patience and eternal friendship.

Ramilja Mikhramova

First of all I would like to thank our thesis supervisor Prof. PhD. Eng. Frank Gielen for the given opportunity to dive into the fascinating world of cloud computing in general and SaaS in particular and to experience the entrepreneurial spirit during the iBoot challenging event.

The person, whom I am undeniably grateful to for her willingness to work on this master thesis together, is my thesis partner Inna. Without her critical view, open mind, great patience, continuous support and invaluable friendship, it would not be possible to realize such a great job.

In addition, I would like to thank everyone who contributed to this thesis with valuable information, feedback and support.

Finally, a special thanks goes to my family who gave me the opportunity to accomplish the studies and to achieve one of the postulated goals.

Samenvatting (Dutch Summary)

Uit talrijk aantal bestaande omschrijvingen van Software aangeboden als een Service (SaaS), wordt volgende definitie geformuleerd waarin alle SaaS kenmerkende elementen geconcentreerd zijn: SaaS is een business model, dat in combinatie met concepten als IaaS (Infrastructuur aangeboden als een Service) en PaaS (Platform aangeboden als een Service) het aanbod van een applicatie via een intern (Intranet) of een extern (Internet) netwerk toelaat, waarbij klanten per gebruik, of op basis van een andere subscriptie mechanismen, gefactureerd worden, en waar één-op-meer principe geldt.

Het oorspronkelijke idee van het concept, waarbij software als een dienst via een netwerk aangeboden wordt, is van Dhr. John McCarthy en dateert van 1960. Echter, werkelijke realisatie was slecht mogelijk mits ontwikkeling van de ondersteunende technologieën, dat slechts in de jaren negentig doorbraken. Niettemin werd het succes ervan belemmerd doordat verspreiding ervan op één-op-één principe gebaseerd was. Namelijk, voor elke gebruiker werd een unieke en/of een aparte toepassing ontwikkeld, dat het realiseren van schaal effecten en andere voordelen van SaaS, verhinderde. Wat SaaS uniek maakt, is vervat in de mogelijkheid om meerdere gebruikers aan één platform te kunnen koppelen.

SaaS business model wordt beschreven gebruik makend van het raamwerk van Dr. Osterwalder, dat uit volgende samenstellende en inter-agerende delen bestaat: (1) offer, dat een meerwaarde voor een klant creëert; (2) klant, dat klanten relatie, -segmentatie en distributie kanalen inhoudt; (3) infrastructuur gedeelte, dat het verschaffen van service toelaat mits collaboraties, strategische activa en -bedrijvigheid; en (4) financiële zijde, waarbij opbrengsten en kosten tegen elkaar worden afgewogen.

Meerwaarde dat SaaS diensten voor de klant creëren, verschillen in functie van het type klant. KMO's worden getypeerd als bedrijven met kleine IT budgetten, waarbij men zoveel mogelijk op hoofdactiviteiten focust, en niet gerelateerde activiteiten uitbesteedt. In dit geval bestaat de waarde propositie uit lagere totale kosten, voorspelbare IT uitgaven, snellere implementatie en gebruik van expertise van de dienstverlenende partij. In tegenstelling tot KMO waarbij men interne IT afdeling volledig probeert te vervangen, worden SaaS diensten binnen grotere ondernemingen complementair aan bestaande services. Dit laat grote bedrijven toe om te focussen op strategische uitdagingen binnen IT afdeling, terwijl ondersteunende functies (bv. e-mail) op een kostefficiënte manier worden uitbesteed.

Aangezien binnen SaaS, diensten via een netwerk of online aangeboden worden, is de aanpak bij het benaderen, segmenteren en verschaffen van de klanten anders dan in het traditionele opzet, waarbij volledige software pakket en daaraan gebonden licentie verkocht worden.

Daarnaast is de klantenstrategie in functie van de grootte, gewicht of belang van de klant. De meest gebruikte aanpak is waarbij kleinere klanten telefonisch of via online kanalen worden onderhouden; terwijl grotere klanten direct met verkoopspersoon communiceren.

Het eerder vermeld voordeel, met name één-op-veel distributiemogelijkheid van SaaS, is grotendeels te wijten aan onderliggende meerlagige infrastructuur en volgroeidheid van de onderliggende applicatie.

Onder financieel luik vallen kostenstructuur en opbrengstgenererende activiteiten. Eerste element omvat alle kosten (initiële investeringen in infrastructuur en hardware, onderzoek en ontwikkeling, verkoop en marketing kosten, etc.) om SaaS diensten te kunnen leveren aan de eindgebruiker. Tweede element, is niet enkel beperkt tot inkomsten uit intekening gebaseerde mechanismen, maar bevat ook inkomstmogelijkheden uit ondersteunende diensten, onderzoek en ontwikkeling, marktstudie rapporten en reclame. Terwijl SaaS leveranciers met hoge initiële kosten geconfronteerd worden, zijn de opbrengsten verspreid over langere periode en zijn ze relatief lager (vergeleken met traditioneel model), wat veroorzaakt dat SaaS bedrijven tijdens startende periode hoge nood aan liquide middelen ervaren.

Het ecosysteem rond SaaS business model wordt gedefinieerd als een complexe set relaties tussen alle interagerende partijen (dienstverleners, gebruikers, ontwikkelaars, etc.) dat als één systeem functioneert met virtuele en fysieke omgeving. Analyse ervan wordt uitgevoerd aan de hand van de Porter's vijf krachten model. De bedreiging van substituten, met name van traditionele licentie verkopers, ASP-, Software+Services dienstverleners, kan als aanzienlijk groot worden beschouwd, afhankelijk van het type substituut. Macht van de leveranciers (bv. PaaS of IaaS leveranciers) is beperkt omwille van sterke groei binnen de industrie. Klanten krijgen bevoordeerde positie binnen SaaS omgeving (door lage omschakelingskosten zijn klanten niet gebonden aan één leverancier, in tegenstelling tot de traditionele licentie opzet), waardoor sterke afnemersmacht wordt gecreëerd. De interne bedrijfstak concurrentie varieert tussen middelmatig en hoog, sterk afhankelijk van welk subsegment binnen SaaS aanbod men in beschouwing neemt. Bedreiging van nieuwe markttoetreders wordt afgezwakt door hoge toetredingsbarrières (voornamelijk hoge initiële investeringen, operationele en structurele uitdagingen).

Voor de analyse van voor- en nadelen wordt een vergelijkende studie van de meest recente SaaS industrierapporten opgesteld, waarbij zowel standpunt van de klant als van de leverancier wordt toegelicht. Voordelen die ten gunste van de klant komen, zijn: ontbreken van of lagere investeringskosten en snelle implementatie procedure, met vervolgens continue (software) vernieuwing. Als nadeel lopen de klanten nog steeds het risico van verlies van informatie doordat data buiten het bedrijf opgeslagen wordt. Voor de SaaS leverancier zijn schaaleffecten en groter bereik van potentiële klanten de grootste troeven. Echter, grote initiële investeringen, trage opbrengsten groei en grotere behoefte aan liquide middelen maken dit model minder aantrekkelijk.

In dit werk voorgestelde theoretische raamwerk wordt toegepast op SinYate initiatief, dat testing diensten voor mobiele applicaties op SaaS basis aanbiedt.

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Utilized Abbreviations

ARR	Annual Recurring Revenue
ASP	Application Software Provider
ASP	Average Selling Price
AIP	Application Infrastructure Provider
API	Application Programming Interface
ARPU	Average Revenue per User
BSP	Business Service Provider
CAC	Customer Acquisition Cost
CCC	Content, Communications and Collaboration
CEO	Chief Executive Officer
CIO	Chief Information Officer
CLTV	Customer Life Time Value
CMRR	Committed/Contracted Monthly Recurring Revenue
CPU	Computing Processing Unit
CRM	Customer Relationship Management
CtA	Cost to Acquire
CtM	Cost to Maintain
DCC	Digital Content Creation
EBITDA	Earnings Before Interest, Taxes, Depreciations and Amortizations
ERP	Enterprise Resource Planning
EU	European Union
G&A	General & Administrative expenses
GAAP	Generally Accepted Accounting Principles
GTM	Go-To-Market
HIPAA	Health Insurance Portability and Accountability Act
HR	Human Resources
IaaS	Infrastructure as a Service
IBS	Internet Business Services
IP	Internet Protocol
ISP	Internet Service Provider
ISV	Independent Software Vendor
IT	Information and Technology

LAN	Local Area Network
LE	Large Enterprise
PaaS	Platform as a Service
PCI	Payment Card Industry
R&D	Research & Development
SG&A	Sales, General & Administrative expenses
S&M	Sales & Marketing
SaaS	Software as a Service
SCM	Supply Chain Management
SI	System Integrator
SIIA	Software and Information Industry Association
SLC	Sales Learning Curve
SOA	Service Oriented Architecture
SSO	Single Sign-On
SLA	Service Level Agreement
SME	Small and Medium sized Enterprises
SSP	Solution Service Provider
TCO	Total Cost of Ownership
VAR	Value Added Reseller
VPN	Virtual Private Network
WAN	Wide Area Network

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0. Introduction

It would not sound surprisingly to anyone that the IT industry is characterized by a high speed of evolution and innovativeness. Since the introduction of the first desktop computer, followed by the World Wide Web availability in each house, it seems rather impossible to track and to identify all new launches in IT world, influencing and, very often even radically, changing the way of doing business.

One of these decisive reveals, which did modify the way of thinking, developing and collaborating in IT and business domains, was the appearance of the concept Cloud Computing, which in turn gave birth to a new business model, known today as Software as a Service (SaaS).

Before we deeply dive into the world of SaaS, let us first try to define and to explain what is actually meant by the SaaS business model. During the analysis it became clear for us that giving one explanation is unfeasible. What's more, Google finds more than 60 different possible definitions of what SaaS is or could be.

*“Software as a service is a **model** of software deployment whereby a **provider** licenses an **application** to customers for use as a **service on demand**...”*
(Software as a Service, 2010)

*“Software as a Service (SaaS) is a software **distribution** model in which applications are **hosted** by a vendor or service provider and made available to customers over a **network**, typically the Internet.”* (Software as a Service, 2006)

*“Software as a Service, SaaS is a software delivery method that provides access to software and its functions **remotely** as a Web-based service.”* (SaaS, 2009)

*“In the Software as a Service model, the application, or service, is deployed from a **centralized data center** across a network – Internet, Intranet, LAN, or VPN – providing access and use on a **recurring fee basis**.”* (Software & Information Industry Association (SIIA), 2001)

Here above, just few definitions, taken from the top 10 ranking in Google search. A rough analysis of the various SaaS definitions shows that all of them have following aspects in common, as for example, Web-based service model – provided over a network – fee based.

To illustrate the general concept behind this business model, let us consider the pioneer in this field, namely Salesforce.com, “[...] *the leader in customer relationship management & cloud computing*” (Salesforce.com, 2010). Salesforce.com considers Software as a Service as “[...] *a way of delivering applications over the Internet - as a service. Instead of installing and maintaining software, you simply access it via the Internet, freeing yourself from complex software and hardware management*” (Salesforce.com, 2010). As stated by Lindsey Armstrong, president, Europe, Middle East and Africa, of Salesforce.com: “*Our platform [...] enables clients to act very quickly, whereas on-site development projects can take years. With SaaS, it could take only months or even weeks, so the system is operational sooner and the return on investment starts earlier. There is certainly a growing sense that SaaS is a better way to bring applications into a company*” (Salesforce.com: SaaS Appeal - Salesforce.com, 2010).

Evidently, from the words of Lindsey Armstrong and from our own analysis, customers and providers of SaaS benefit from a lot of advantages of the SaaS business model. However, despite all the obvious benefits, offered and prospected by the SaaS business model, not all companies succeed in its effective and beneficial implementation.

As consequence, in our thesis we try to provide an answer, as objective as possible, to the following questions, considering both the supply and demand side of the SaaS business model:

WHAT ARE THE DETERMINANT FACTORS OF THE SUCCESSFUL IMPLEMENTATION OF SAAS BUSINESS MODEL?

WHERE DO THE FAILURES IN THE SAAS BUSINESS MODEL REALIZATION ORIGINATE FROM?

In the first part of our work, we try to clarify the origin of SaaS Business Model. Furthermore, we attempt to formulate our own definition of SaaS, based on different studies of the well-known research agencies as Gartner, Accenture, McKinsey and the industry rivals as Microsoft Corporation.

Part two lightens the SaaS Business Model through Dr. A. Osterwalder’s Business Model Canvas, which is composed of four main business areas, namely infrastructure, offer, finance and customer.

In the third part the readers are presented with the Porter’s Five Forces model, applied for the analysis of the SaaS ecosystem. By identifying the existing substitute products or services, the bargaining power of the suppliers and customers, the intensity of the competition and the possible entry barriers, we try to assess the attractiveness and competitiveness of the SaaS

industry. In addition, we provide the reader with the major advantages and disadvantages of SaaS for the customers as well as the vendors of the on-demand solutions.

In the fourth part we attempt to give the answers to the key research questions, firstly providing the reader with the detailed analysis of the factors which are determinant for the successful implementation of SaaS. Secondly, we try to find out what can go wrong during the introduction and realization of the SaaS project in a company.

In addition, to make it more transparent, we illustrate the SaaS implementation by the real world example, namely SinYate – a small start-up company, which provides its services, specifically testing the applications for mobile devices, on Software as a Service basis.

Furthermore, we try to forecast whether there is a future for SaaS business model and what the potentials and possible scenarios are.

Finally, we end up with a conclusion, summarizing main results: firstly, the underlying difficulties and hidden benefits of SaaS business model for the involved parties, namely providers of the services and the customers and secondly the success and failure factors which are determinant during the implementation of SaaS.

1. Origin of SaaS business model

1.1. Evolution

In order to find out where the Software as a Service originates from, we had to dig very deeply in the chronicles of the computer science. We went back in time till 1961, when John McCarthy¹ postulated during a speech at Massachusetts Institute of Technology, for the first time the idea of utility computing. The idea was based on the commoditization of the electrical grid in order to distribute the services publicly in a more efficient and cost effective way. The parallel was made for the computer time-sharing technology where computing power or even specific applications are provided as a service through the platform, invoicing the customer. Despite the popularity of the forwarded idea, the concept did not get the opportunity to prosper, because the required enabling technologies were scarcely out of the egg.

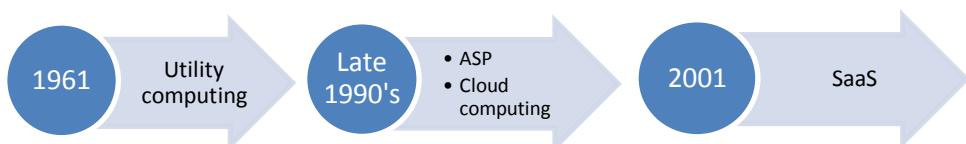


FIGURE 1: HISTORICAL EVOLUTION OF SaaS

Thereupon, in late 1990's the development of computer technologies reached the appropriate levels of commercialization, giving the revival to the McCarthy's idea in the form of application service providers and cloud computing.

Finally, in the beginning of the 21st century, Software as a Service was officially introduced by the Software and Information Industry Association (SIIA). In the published paper “Software as a Service: Strategic Backgrounder”, SIIA stipulates the architecture of SaaS and required adjustments to the business logic, compared to the previous selling strategy and tactics. (Software & Informationa Industry Association (SIIA), 2001) The historical evolution, described above, is reflected in FIGURE 1.

As a result of the innovation in information technology hardware, infrastructure and the expansion of the World Wide Web became as such the victims of the commoditization process, resulting in the loss of competitive advantage. Consequently, internal IT development and the

¹ John McCarthy (born September 4, 1927, in Boston, Massachusetts), is an American computer scientist and cognitive scientist who received the Turing Award in 1971 for his major contributions to the field of Artificial Intelligence (AI).

use of on-premise software shifted to the non-core activities, becoming subject of outsourcing decisions in order to save operating costs. Living example is the noticeable switch from the on-premises software for database management, HR, accounting and CRM policies to a one-click integrated solution as offered by Salesforce.com (see FIGURE 2).

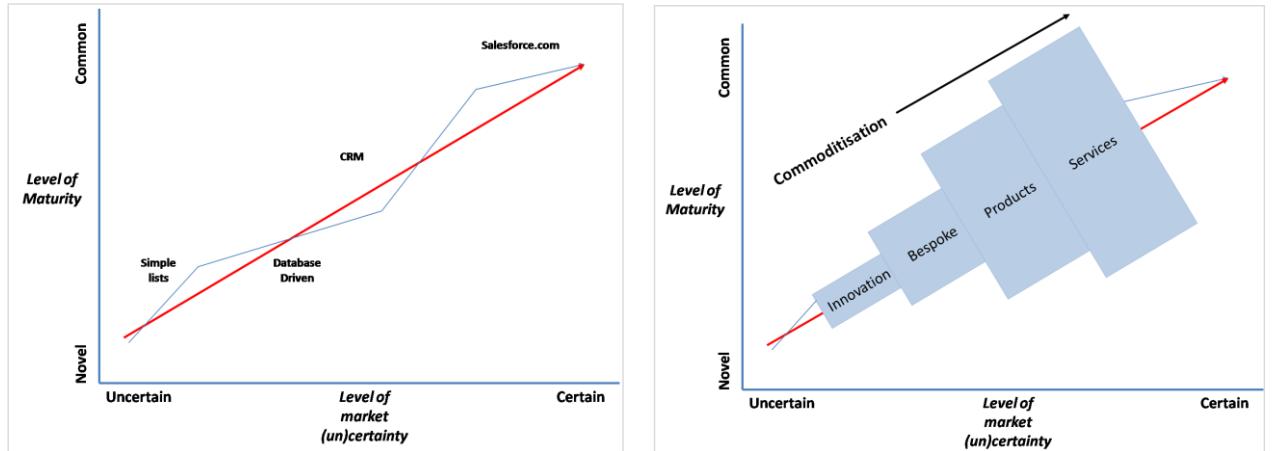


FIGURE 2: COMMODITIZATION PROCESS (Geens, 2009)

1.2. Definition

Like already mentioned in the introduction, searching for an exact definition of Software as a Service is like looking for a needle in a haystack. Facing this problem, we decided to consult the titans of the industry in order to formulate our own understanding on the SaaS business model.

The very first definition of Software as a Service, provided by Software and Information Industry Association (**SIIA**) states: “[...] *In the software as a service model, the application or service, is deployed from a centralized data centre across a network – internet, intranet, LAN, or VPN – providing access and use on a recurring fee basis. Users “rent”, “subscribe to”, “are assigned” or “are granted access to” the applications from the central provider*” (Software & Information Industry Association (SIIA), 2001).

A much broader definition is formulated by the **Microsoft Corporation**: “[...] *Software deployed as a hosted service and accessed over the Internet*” (Chong & Carraro, 2006a). However, this description also incorporates such terms as application service provider (ASP), application infrastructure providers (AIPs), internet business services (IBS), business service provider (BSP), solution service provider (SSP) and more, which approach the business challenges from different angles.

Complementary, **Gartner** interprets software as a service in the following way: “[...] software that’s owned delivered and managed remotely by one or more providers. [...] The provider delivers an application based on a single set of common code and data definitions, which are consumed in a one-to-many model by all contracted customers anytime on a pay-for-use basis, or as a subscription based on use metrics” (Clark, et al., 2006, p. 4).

Finally, in a more specific resource, namely the **IT dictionary**, Software as a Service is defined as: “[...] a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet”.

Analysing the previous statements, we can conclude that they are rather similar, but at the same time none of them provide the full picture of the concept. Aiming at completeness and clarity, we worked out our own synthesis.

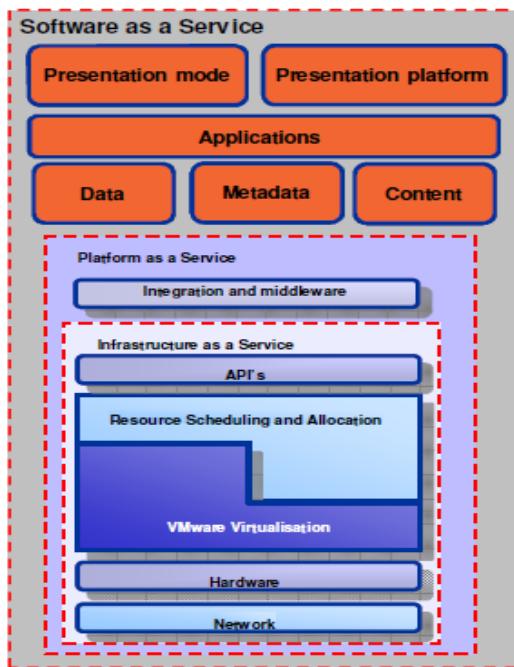


FIGURE 3: SaaS MULTILAYER MODEL
(Hughes, 2009)

Firstly, Software as a Service is a **multilayer model**, existing of an infrastructure as a service (IaaS) and platform as a service (PaaS), complemented by the applications developed and owned by the service provider (see FIGURE 3). The former component exists of networks, servers, storage and application programming interface, which are responsible for enabling convenient, on-demand access to computing resources. Enriching IaaS with middleware, that connects the application code with run-time infrastructure, one creates the PaaS. The latter allows interoperability between the infrastructure, various operating systems and hosted applications.

Secondly, the customers use the software on the **subscription base**, on conditions negotiated in the contract and receive in return service promised in the Service Level Agreement. Furthermore, the users take the advantage of the interconnectivity with the server in order to utilize the applications independently of their location.

Next important issue in SaaS is **one-to-many concept**, which implies that a standard package of applications is provided to as many customers as possible minimizing the customization.

As conclusion to the synthesis we made here above, we have formulated our own comprehensive definition of Software as a Service business model, which sounds as follows:

Software as a Service is a multilayer business model, enabled by IaaS and PaaS, which allows the provision of the application to the customers over the network on a subscription base, following the one-to-many principle.

2. SaaS: Analysis of Business Model components

At the end of the previous part we formulated our own definition of Software as a Service, categorizing it as a Business Model. And before we start the analysis of SaaS Business Model as such, let us first create a shared understanding of what a business model actually is. In order to accomplish this task, we make a use of a Business Model Canvas, developed at the University of Lausanne by Dr. Alexander Osterwalder² and successfully applied in such companies as IBM, Deloitte, PriceWaterHouseCoopers and more.

In his recent book “Business Model Generation”, Dr. Osterwalder together with the co-author Dr. Yves Pigneur, points out that “[...] A *business model* describes the rationale of how an organization creates, delivers and captures value” (Osterwalder & Pigneur, 2009, p. 14). Furthermore, the authors believe that a business model can best be evaluated through nine building blocks, covering four main business areas (see FIGURE 4):

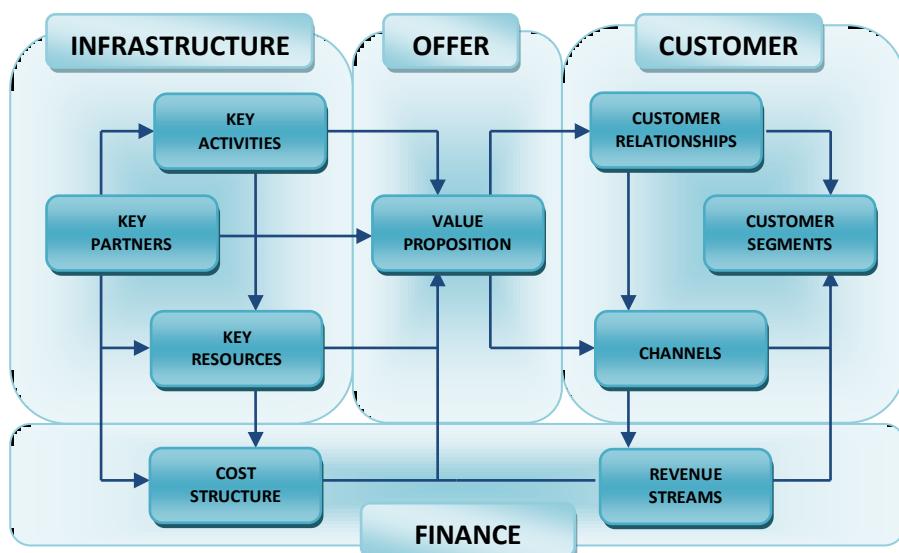


FIGURE 4: BUSINESS MODEL CANVAS (Osterwalder & Pigneur, 2009)

- **Infrastructure:**

- *Key resources* are the crucial tangible or intangible **assets**, which allow an enterprise to create and offer a Value Proposition, reach markets, maintain relationships with Customer Segments, and earn revenues.

² Dr. Alexander Osterwalder holds a Ph.D degree from the University of Lausanne and is a freelance author, speaker and workshop facilitator on the topic of business model innovation. He coaches executives, entrepreneurs and consultants around the globe to help them better understand how they can transform their business models.

- *Key activities* are the most important actions a company must take to operate successfully, and which are necessary to create and offer the Value Proposition, reach markets, maintain Customer Relationships, and earn revenues.
- *Key partnerships* are the network of suppliers and partners, meant to optimize the postulated business model, achieve economies of scale, reduce risk and/or acquire particular resources and activities.

- **Offer**

- *Value proposition* building block incorporates the bundle of products and services that create value for a specific Customer Segment, solving particular customer problem or satisfying a particular customer need.

- **Customer**

- *Customer segments* building block describes the audience, being different groups of people or organizations, which enterprise is targeting and aiming to reach.
- *Channels* include the company's marketing and distribution strategy, required to communicate with and to reach the Customer Segments in order to deliver the intended Value Proposition.
- *Customer relationships* comprise the links a company tries to establish between itself and its different Customer Segments.

- **Finance**

- *Cost structure* includes all the costs incurred to operate a business model.
- *Revenue streams* are the revenue flows or cash, generated from each Customer Segment.

Following the example of business giants like Deloitte and IBM, it seems for us very useful to use Dr. Osterwald's Business Model Canvas concept as a framework for the analysis of SaaS Business Model, which follows here below.

2.1. Value proposition

Before starting the analysis of the value proposition proffered by the SaaS business model, it seems important to us to provide a neutral and exhaustive definition of the term ‘value proposition’ as such. From the research on business models, “*The Business Model Ontology - a proposition in a design science approach*” at the University of Lausanne, Switzerland, follows a satiated description:

“A value proposition represents value for one or several target customer(s) and is based on one or several capability(ies). It can be further decomposed into its set of elementary offering(s). A value proposition is characterized by its attributes description, reasoning, value level and price level and an optional life cycle.”

(Osterwalder, 2004, p.50)

To stay in line with definition, we describe the value proposition in function of target segments of a SaaS solution provider. Therefore working further on the statistical study from the New York University (Xin & Levina, 2008), our own qualitative research confirms that the need for SaaS solutions and the circumstances under which potential clients will seize for it, differs in function of firm’s size (expressed in number of users employing certain application). In the majority of the cases, **SME** will be using SaaS solution as a **substitute** product to the available on-premise solutions; while **large enterprises** do consider it as a **complement** to the on-premise software.

2.1.1. Value proposition for small- and medium sized enterprises (SME)

Very often SMEs do not have a lot of freedom of choice, what leads to a situation as “SaaS or nothing”. Being limited by budget constraints, SMEs do not have enough resources to develop and deploy the (licensed) software and supporting infrastructure, required for the operations. Based on this customer pain, SaaS providers constitute their value proposition on the following pillars (The SaaS Value Proposition, 2010):

- **(On average) reduced Total Cost of Ownership (TCO)**

SaaS business model provides a superior offering for a relatively small, but constant fraction of the investment, eliminating conventional on-premise costs such as implementation, training, hardware, staffing, customization and/or integration and post-software procurement costs. For the latter factor, also known as “hidden costs”, “[...]

most analysts indicate that the ratio or the relationship between hidden costs and software investment is at least 2 to 1 (e.g. for every dollar spent on software license, two dollars will be spent on hidden costs) and often 4 to 1 or higher” (SaaS Value Proposition, 2010). When describing this phenomenon, the iceberg analogy can be made (SaaS Value Proposition, 2010).

- **Predictable IT expenditures and reduced risks**

Variable and unpredictable maintenance costs are substituted by the constant monthly payments, prohibiting this way the budget overrun for IT projects. In case of unsatisfying services customers still have the option to terminate the agreement.

- **Faster time to benefits**

The implementation of the SaaS solution takes on average 45% to 55% of the time required to install traditional (licensed) on-premise software.

- **Outsourced expertise**

SaaS-based solution allows the customer to focus on their core capabilities and make extensive use of the vendor’s expertise.

- **Scalability options in function of business needs**

SaaS-based solutions allow the SMEs to chase the internal demand for a certain application, extending the subscription base if necessary or decreasing it in case of surplus capacity.

2.1.2. Value proposition for Large Enterprises (LEs)

The rationale behind the reasons why LEs would source solution from the cloud instead of developing and implementing it in-house is quite different from the logic followed by the SMEs. Therefore SaaS-vendor must focus on other pain-points than those mentioned above. From the market research following value elements appeared:

- **Opportunity to focus on core activities** (The SaaS Architecture Consultation Service, 2007)

Outsourcing simple and supporting applications (that do not constitute any competitive advantage, but are necessary for daily operations, such as e-mail applications) to the SaaS-based vendors, creates a double value. Primarily, “[...] by transferring the

responsibility for these “overhead” activities to a third party, the IT department can focus more on high-value activities that align with and support the business goals of the enterprise” (The SaaS Architecture Consultation Service, 2007, p.1).

- **Cost efficiency and cost effectiveness of service delivery**

Simultaneously, the required functionalities are delivered in a less expensive way, because “[...] *SaaS projects in very large enterprises will require relatively smaller build teams as well as reduced project management and business analyst requirements*” (Speyer, 2007).

Our description of the potential value proposition is also in line with the qualitative study “*Evaluating the software as a service business model: from CPU time-sharing to online innovation sharing*” performed by the Department of Business Technology at the Helsinki School of Economics (2005). What is more, described value propositions are comparable to those associated with traditional IT outsourcing: “[...] *better focus on core competencies, easier to get access to technical expertise, and predictable and/or lower costs*” (Sääksjärvi, Lassila, Nordström, 2005, p.6).

However, to have a successful and sustainable business model, with the long term value generation, four independent dimensions must be equally represented in the value proposition or supported by the value proposition, namely: **efficiency, complementarities, lock-in and novelty** (Amit & Zott, 2001). As we see from the above stated benefits, only efficiency dimension is reinforced. The other three dimensions (complementarities, lock-in and novelty) are somehow neglected or worse: value elements contribute to the anti-pod of the required dimensions. Instead of locking-in the customer, vendor grants the freedom to move to other solution providers in case of dissatisfaction. Or the novelty aspect is ruined from the beginning, taking into account that the provided application does not create any competitive advantage for the customer, because it is also evenly available to its competitors.

Conclusively, these results propose that the value creation potential within SaaS environment cannot be explained by a single entrepreneurship or strategic management theory, used as a framework in our analysis of business model sustainability.

2.1.3. Offering element of the value proposition

It would be unwise to describe a single offering as provided by the Salesforce.com or Google Inc, or at the same time an endless task if we described all possible and available offerings on the market. Therefore, we will just present a plethora of the possible offerings within SaaS-environment, based on the research performed by the Leading Edge Journal, at the same time taking into account elementary offering definition:

“An elementary offering is a part of an overall value proposition. It is characterized by its attributes description, reasoning, life cycle, value level and price level” (Osterwalder, 2004, p. 50).

Following paragraphs concentrate on the specific attributes of the SaaS offering (e.g. reasoning, life cycle, value level and price level), reconciling the theoretical discourse and the current market habits for the value proposition.

Reasoning element in the offering definition captures **the why** “[...] *a provider thinks that its value proposition or a specific elementary offering could be valuable to the customer*” (Osterwalder, 2004, p.51). This is hidden in several essentials as diminution of the customer risk, facilitation of the transactions through reduction of efforts or value creation through usage of employment of the product/service as such. For SaaS solutions all the three drivers constitute the ‘reasoning element’:

- **Customer risk** covers various kinds of risks. For example the **obsolescence risk** is reduced to the bare minimum compared to the off-line solutions through the on-line delivery model. The customer does not need to acquire the complete (licensed) package with redundant functions (e.g. SAP packages). On the contrary, clients are subscribed only to the software particles that are required and only during the period of need (e.g. SalesForce.com).
- Under **customer efforts**, we understand all the efforts needed to search, evaluate, acquire, maintain, and operate the specific software application. Under specific conditions customers experience **lower efforts** and partly **lower lifecycle costs** that are embodied in the **lower total cost of ownership** (TCO).
- For the third element, positive **value creation** is conditional. It is only true when *“assumed customer value matches perceived customer value after the consumption of an elementary offering”* (Osterwalder, 2004, p.51). With other words, it is true when the

product or service attributes correspond to customer needs. This statement can be validated by the inherent characteristic of SaaS: SaaS solutions are **purpose-built** (France, Haywood, Gilroy, 2009) and enjoy the 90% renewal rates (Kaplan, 2009).

However, in corroboration of these facts no scientific consensus has been found between various studies on SaaS functional satisfaction levels. For example Forrester's and Gartner's researches state that “[...] satisfaction levels among SaaS users are little more than lukewarm” where “[...] 33 percent (among users and prospects of SaaS solutions in 333 enterprises in the U.S. and the U.K) said the solution didn't meet technical requirements.” (Pettey & Stevens, 2009). While preliminary findings from Saugatuck's 2008 SaaS research agenda show that “[...] SaaS customer satisfaction is very strong – especially around SaaS Wave I requirements such as solution functionality, response time, availability and pricing” (McNee, 2008, p.1). However an important remark here is that in this research a distinction is made between three phases (waves) in SaaS development (infra, p. 77). “[...] Satisfaction around SaaS Wave II and III requirements – especially around support for customized, personalized workflows, integration with on-premise data and process, and greater inter-company collaboration is much lower” (McNee, 2008, p.1).

Next element is the **value level** or also called customer utility, that is measured on the qualitative scale and ranges between “**me-too**” values to “**innovation**”. A large variety of customer utility offers, proffered within the SaaS ecosystem, is represented on FIGURE 5, distinguishing between *commodity solutions* and the *specialized or more sophisticated offers*.

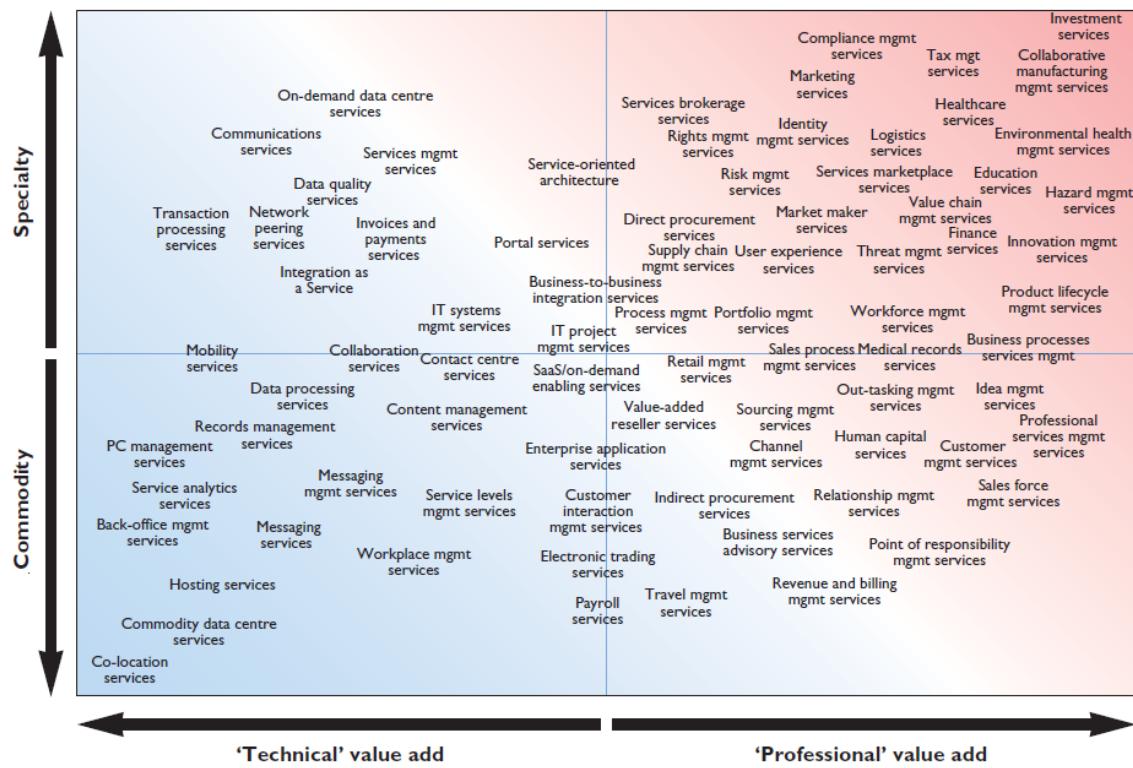


FIGURE 5: POSSIBLE SaaS SERVICES (Sykes, 2006)

The former type is characterized by absence of any differentiation, and the only competitive trump is the price (e.g. commodity - technical value add quadrant on FIGURE 5). In this case services are offered for free (e.g. Google's applications as e-mail services, scheduling, etc.).

In reverse, for the latter type “[...] firm introduces either a completely new product or service or revolutionary combination of products and services” (Osterwalder, 2004, p.51), such as (relatively) customized solutions (e.g. specialty - professional value add quadrant on FIGURE 5 with SaaS Supply Chain Management solutions and services as offered by QLogitec³).

With the above discussion on the diverse offer types, we also touched upon the subject of the evolution the SaaS value proposition made during this decade shifting from the cost-effective delivery of stand-alone application services (wave I) to workflow-and collaboration-enabled business transformation (wave III) (infra, p. 77).

As a matter of course, **price level** element is insurmountably tied to the **customer utility element**. The pricing strategy within SaaS ecosystem depends largely on the competition and the particularity of a certain solution, respecting the ‘traditional market’ rationale. But what is worth mentioning is the SaaS business model innovation compared to the on-premise (licensed)

³QLogitec is a leader in Supply Chain Business Process Automation, Integration, and Collaboration serving Retail and Consumer Packaged Goods (CPG) markets worldwide. QLogitec provides Software-as-a-Service (SaaS) and Integration-as-a-Service (IaaS) solutions to optimize supply chain operations for improved visibility and cost savings. URL: <<http://www.qlogitek.com/en/saas-supply-chain-solutions.aspx>> (11/03/2010)

software value delivery. SaaS-based solutions “[...] have shifted the value frontier: providing the same level of value at a lower price, or more value at the same price or even better, more value at a lower price than the rest of the industry” (Osterwalder, 2004, p.53).

2.2. Customer

2.2.1. Customer relationship

With the emergence of SaaS, the business rationale shifted from the push-based model, where vendor has to “[...] interrupt, tell and sell” (Heinz, 2009), to pull-based, where solutions are found through interchange of informative and thought leadership content. In effect, this transition is reflected in the customer relationship (management) within SaaS ecosystem. The uniqueness lies in the different approach compared to the on-premise setting. Issues related to the software license rights grant the customer the freedom-to-change/exit, in case of unsatisfying solution. SaaS vendor became a supplier of a service, what implies that SaaS-providers must commit a considerable investment in order to provide this service and to follow the innovation pace (Bertuzzi, 2009). Finally, the SaaS vendors have to reassure customers that system back-up, contingency- and disaster recovery plans will be performed efficiently and in accordance with the Service Level Agreements.

Logically, these differences in settings would have to lead to the disappearance of the distinction between the so called sales “hunters” and “farmers” (Bertuzzi, 2009), who are explicitly present in the on-premise setting (e.g. New Business Development Executive versus Account Manager (Gilroy 2010)). However, no industry consensus is found, given the Bessemer’s explicit advice to separate “farmers” and “hunters”, due to the different approach.

Our qualitative research suggests that amalgamation and divergence of sales representatives depends on the SaaS vendor’s **CMRR⁴ growth** (in line with Bessemer’s argumentation) (infra, p. 64). However, during the initial start-up period (new business acquisition until \$300,000 CMRR), given the large upfront investment and resource scarcity, sales force is constrained and it is possible that customers often deal with the same contact person before, during and after the contract closure (amalgamation phase). As the sales process climbs the Sales Learning Curve (SLC) and “[...] starts to hit the sales inflection point” (Botteri et al., 2010, p.6), sales force can

⁴ CMRR stands for Contracted Monthly Recurring Revenue (infra p.64)

be expanded and specialized (divergence phase: new business acquisition and business retention). Finally in the last stage, SaaS firm may supplement its sales force with renewal-oriented account managers.

Customer relationship management within the SaaS business model depends not only on the progress of the sales process on the Sales Learning Curve, but also on the **maturity of the relationship** between SaaS vendor and its (potential) customer (ranging between customer acquisition and customer development stage in function of the sales cycle). Each maturity stage is characterized by the specific relationship mechanisms and approach.

Importance of the **acquisition phase** cannot be overemphasized. The SaaS vendors cannot capitalize on the one-time (large) payments as their on-premise counterparts do. Therefore the former party has to ensure a long term sustainable stream of smaller subscriptions, what implicitly signifies that the customer base must be numerous and even with the small churn rate (lower than 10% for salesForce.com), customers are lost, and thus new customers must be continuously acquired in order to stay in business (viability condition where renewal revenue plus up sell should be greater than 100% (Shamia, 2008)).

The acquisition phase is decomposed into the leads qualification, promotion of the opportunity to the leads, solution development, roadblocks removal and sales negotiation and deal closure. Assumption that all leads are equal, which follows from mono-channel character of the SaaS service distribution (namely the Internet as the only medium), is incorrect at the origin. Leads are different at the level of perspectives (in function of the firm's structure and the purchasing process) and the needs (potential business pain). In addition, the customers approach SaaS vendor at “[...] *the different levels of readiness to directly engage and buy the SaaS-based solution*” (Chase, Alliance, Heinz, 2009, p.2). Ignoring this fact and pushing leads into the sales cycle, without preparing them for transition from on-premise to SaaS, deteriorates the lead's potential, (“[...] *harms the relationship and significantly decreases the likelihood of converting lead into sustainable business*” (Chase et al., 2009, p.2)) and may even contribute to SaaS vendor's failure (infra, p. 69).

During the **retention phase** it is important to take Bessemer's 7th Cloud Computing Law in to account, which states that “[...] *the most important part of Software-as-a-Service isn't "Software" it's "Service"! Support, support, support!*” (Botteri et al., 2010, p.10).

In addition to Bessemer's Laws for cloud computing, Altimeter Group⁵ postulated “*Customer Bill of Rights*” for SaaS companies, including input from 57 ecosystem contributors. The purpose of this document is “[...] to serve as a reference, checklist, and point of discussion with SaaS Vendors for prospects and clients who have made the decision to begin a SaaS deployment” (Wang & Owyang, 2009, p.4). But at the same time, we are convinced that these practices are important issues to consider for SaaS providers in particular, in order to excel in service delivery and to retain the customer. Altimeter Croup applies the SaaS **Ownership Life Cycle**, where ownership is shifted from perpetual license to perpetual usage. The retention phase consists of adoption, optimization and renewal of SaaS based solution. Each subdivision is characterized by several CRM properties. We highlight the most important and relevant properties for the SaaS vendor.

During the **adoption phase**, where customer utilizes the solution across the organization, it is important for SaaS vendor to address “[...] sourcing and day-to-day processing perspective” (Wang & Owyang, 2009, p.11). The short and long term efficient processing is convoyed by downtime and disaster recovery/mitigation plans.

Optimization phase, is the point where customer changes the way it expands and/or maintains in the usage of the solution (for instance in case of merger or acquisition, owned affiliates, etc). The most important relationship triggers are multiple support options and price protection options. The former element must ensure that the proposed solution corresponds the actual usage, which can be (and should be) tracked as the vendor has complete overview and can survey the customer’s handlings. The latter element should clearly disclose the pricing bands for each bulk increment and the discount rationale.

To ensure great **retention/renewal** rates and referrals to new business, the effective account management program is based on trusted advisory, including “[...] Account Reviews, getting integrated into the customer’s business processes, executive to executive relations and customer advisory councils.” (Chase et al., 2009, p.2).

In addition to the relationship supporting necessities own to phased approach, there is also one which is applicable to **all stages** of ownership life cycle and/or customer life cycle. SaaS vendor should always provide on-going performance metrics. Transparency in the quality and service

⁵ Altimeter Group is a strategy consulting firm that provides companies with a pragmatic approach to disruptive technologies in four areas of focus: Leadership and Management, Customer Strategy, Enterprise Strategy, and Innovation and Design. URL: <<http://www.altimetergroup.com/>>

level assessment enables the customer to monitor the quality stated in the SLA, contributing to trust establishment.

2.2.2. Channel strategy

Discussion on channel strategies within the SaaS environment is again divided between two camps. On the one hand we find very optimistic parties believing in the power of the **internet** and considering it as the panacea solution for the SaaS based businesses. The new 1:1 relationship with customers (through freemium models, limited trials, etc.), as discussed in the fourth Bessemer's Cloud Computing Law, promotes to forget the traditional software channels from the on-premise setting (e.g. value added reseller or software and integration companies as IBM, Oracle, HP, Accenture, etc. (Johnson, 2008; Botteri et al., 2010)).

The more pragmatic SaaS analysts react on the above statement, motivating with the antitheses that it is impossible to have a product that sells itself (assuming that customers have to find product themselves, serve themselves and adapt the product themselves). Therefore **segmentation model** is promoted, where traditional partners receive an important role depending on their position in the value chain and the customer type.

For instance Salesforce.com approaches SME through small partners, telephone representatives and online channels. While larger or corporate clients are served through direct sales model and SI/VAR (SaaS Channels and the VAR Market, 2007).

For our discussion FIGURE 6 includes the entire range of xSP, including application, infrastructure providers and application service providers.



FIGURE 6: SaaS VALUE CHAIN

Our position supports the more pragmatic view; where the role of the intermediaries must be changed. In line with the book "*Channel Excellence*" by Axel Shultz (2007), we believe that traditional VAR must make a transition to **SaaS catalysts**, accompanied with the shift from the technology expertise focus to the business process expertise (Shultz, 2007). Shultz defines SaaS catalyst as "[...] company or even individual that helps users or customers to select the best possible SaaS application for their company; SaaS catalyst does not produce the SaaS software,

but helps customers to implement such systems or helps customers to adjust business processes with new software” (Shultz, 2007, p.270).

2.2.3. Target customer

The answer to the question “*Which customers to target within the SaaS ecosystem?*” is difficult to find. Simultaneously, industry is full of contradictions: Gartner claims that SaaS based solutions are meant for SME’s (Bitterer et al., 2008), while companies as Toyota Motor Europe, BARCO International, the Haagen-Dazs Shoppe Company, O₂ and many other international firms do use the services provided by the Salesforce.com⁶. In our quest for this paradox we found out that generally related terms as “*SME’s*” or “*large enterprises*” are not applicable as a description for SaaS’ target customer. It is the amount of potential users of a certain application (and the associated TCO and annual costs per employee) that prescribes whether a customer is going to adapt a SaaS-based solution or not. A general **profile** of SaaS vendor’s customer constitutes of the following elements:

- As Bessemer’s Cloud Computing Law number six states “[...] *by definition, your sales prospects are online*” (Botteri et al., 2010, p.9). Selling a solution that requires an internet connection and a web browser for access, means that prospects are **online**. (Botteri et al., 2010)
- Firms that do **not have strong internal IT support** (as SME) or firms where IT department is concentrated on core capabilities, while peripheral functions can be **outsourced** to SaaS providers (The Target Customers for SaaS, 2009).
- Firms that do **not have the resources for internal IT support** (as SME) and cannot afford commercial licensed package, MS Windows Server, MS SQL Server or Oracle, etc.
- The **user base** (for example for Google Applications it is constrained to 3000 users (Savings Calculator, 2010)) is relatively **small** (The Target Customers for SaaS, 2009). It seems logically, that is it economically irresponsible to invest and elaborate complete internal IT unit in order to support only few collaborators.

⁶ For the whole list of Salesforce.com’s customers visit URL: <<http://www.salesforce.com/customers/>>

In line with "*Bessemer's Top 10 Laws for Cloud Computing and SaaS*" the members of SandHill.com⁷ elaborated "*Ten Laws for SaaS Sales & Marketing Success*". The major conclusions ensuing from SandHill.com's article are the conditions that determine which customers should be selected and which should be abandoned (Chase et al., 2009). It boils down to the stipulations here below.

- If (1/3 of the) Customer Lifetime Value (**CLV**) **accedes** Customer Acquisition Cost (**CAC**), then prospect should be considered as a potential valuable customer (see FIGURE 7). (Shamia, 2008)
- If (1/3 of the) CLV does not cover the CAC, this type of prospects should be neglected (see FIGURE 8). (Skok, 2009)
- And if the customer is selected, following **CAC ratio** calculations, the investment (made on customer in function of sales and marketing) should be **recovered in less than twelve months**. (Skok, 2009)

A well balanced business model

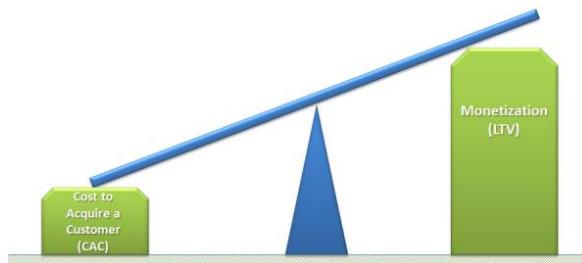


FIGURE 7: WELL BALANCED BUSINESS MODEL (Skok, 2009)

An out of balance business model

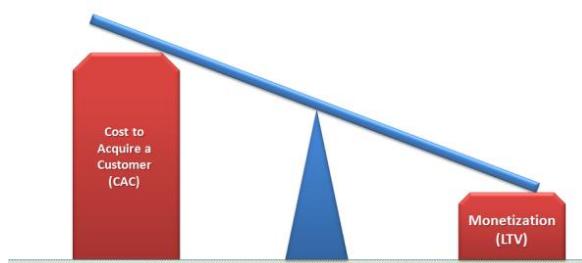


FIGURE 8: OUT OF BALANCE BUSINESS MODEL (Skok, 2009)

⁷ SandHill.com is the only online resource developed exclusively for enterprise software executives. The site delivers strategic news, opinion, research and networking opportunities to more than 10,000 CEOs, COOs, CFOs, CTOs, CMOs, VPs of Engineering, R&D, Services & Support, Venture Capitalists and members of the software industry eco-system. URL: <<http://www.sandhill.com/>>

In the following paragraphs we specify how average Customer Lifetime Value and the SaaS Customer Acquisition Costs are established.

- **Calculation of Lifetime Value of a Customer** (Dunham, 2009; Botteri, 2007)

$$CLV = NPV(ARR) - (CtM + CtA)$$

Customer's Lifetime Value is the ability to monetize on a customer, and consequently is the difference between Net Present Value (*NPV*) of Annual Recurring Revenue (*ARR*), or recurring profit streams, and Costs to Acquire (*CtA*) and Maintain (*CtM*) a customer. Depending on the firm's maturity, 'lifetime' period is assumed to be 3 to 5 years, if SaaS vendor has no customer history; and is depicted from churn rates, if SaaS vendor can statistically determine it.

Annual Recurring Revenue (*ARR*) is the expected future (annual) earnings streams associated with a customer. (Cowan, 2009)

Costs to Acquire (*CtA*) include all expenses during a certain period that origin from sales and marketing activities. The period is in function of *Time to Close*, matching this way the acquisition expenses and the customer gaining.

Costs to Maintain (*CtM*) is self explicatory, and covers all expenses necessary to maintain a customer. It includes hosting charges, hardware and software renewal, support, staff operations and outside services required to maintain customer instances outside of sales, marketing, R&D, and product development.

- **Calculation of the average Customer Acquisition Cost**

$$CAC = \frac{\text{Sales and marketing costs}}{\text{Number of acquired customers}}$$

Average Customer Acquisition Cost (CAC) over a given period is a ratio between costs of sales and marketing, including salaries and other headcount related expenses, and the number of customers that a SaaS vendor acquired in that period. (Skok, 2009)

Important metric associated with the average Customer Acquisition Cost is the *CAC* ratio, which serves as an objective benchmark of future value creation.

$$CAC \text{ ratio } (Q_{n+1}) = \frac{\Delta \text{ Gross margin } (Q_{n+1})}{\text{Sales and marketing costs } (Q_n)}$$

“[...] The CAC ratio determines the payback time on sales and marketing investment.” (Botteri, 2009, p.2) For example CAC ratio of 0.5, requires two years in order to pay the investment back.

From our subsequent analysis on profitability and viability of firms within SaaS ecosystem we discovered the paradox between high revenue and low or negative profitability (supra, p.34). Surprisingly, what appeared from the market research is that predictor for the firm’s profitability is not the revenue, but the (gross) margin that can be realized on customers, well represented in the *CAC ratio*.

This leads us to the conclusion that the **answer to profitability** lies in the **margin** that a firm can realize on its customers and whether it is able to find the right **balance between CAC and CLV values** (see FIGURE 9).

What can drive the balance

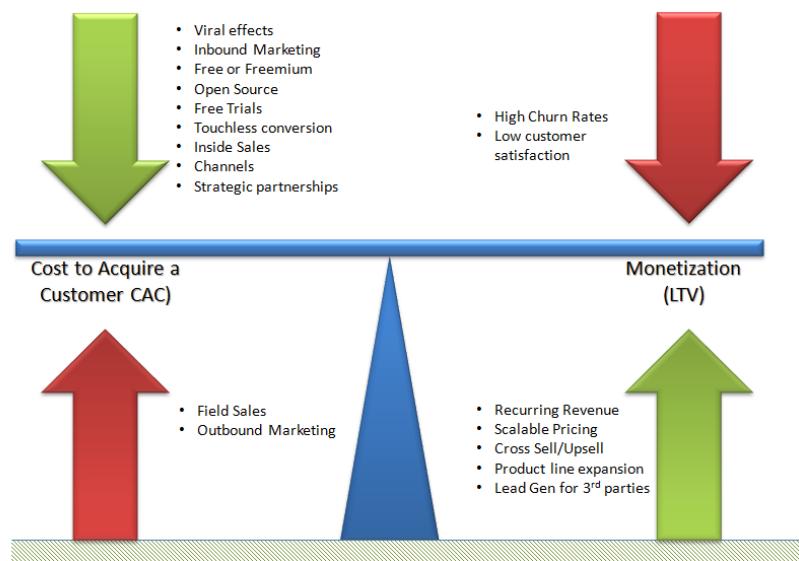


FIGURE 9: BALANCING BETWEEN CAC AND CLV VALUES (Skok, 2009)

2.3. Infrastructure

2.3.1. Key activities

One of the important issues to consider when regarding the possibility of offering the application in the form of a service instead of traditional on-premise software is what kind of infrastructure is required in order to successfully deliver the software to the customers. There are three major key considerations that have to be taken into account by the software vendor during the infrastructure set-up process (The Infrastructure Behind SaaS, 2009).

Seen the fact that the delivery of the service is accomplished through a network, the first key activity is the provision of the continuous *connectivity* between the provider, the software and the customer.

Secondly, the software provider must guarantee the *business continuity* by setting up the required network, server and storage infrastructure.

Finally, the SaaS supplier is responsible for the assurance of the *security* during the service delivery and data storage, which implies that the measures like backup, disaster recovery and appropriate authentication policies are undertaken.

2.3.2. Key resources

As explained in the beginning of this chapter (supra, p. 8), key resources imply the crucial tangible or intangible **assets**, which are necessary for an enterprise to create and offer a value proposition, reach markets, maintain relationships with customers, and generate revenues.

Keeping in mind the three key issues, mentioned here above and taking into account the virtual delivery aspect of the SaaS business model, the key resources are actually represented by the appropriate composition of the **logical architecture**, the choice of the most suitable **maturity level**, the arrangement of the proper **data-architecture** and **authentication system**.

a. Logical architecture

Coming back to the definition of Software as a Service, given in the previous chapter (supra, p.5), one may already know that SaaS is build up of three major layers (see FIGURE 10), namely *infrastructure* layer (IaaS), application *platform* layer (PaaS) and *application* layer. Let us take a closer look at each layer apart.

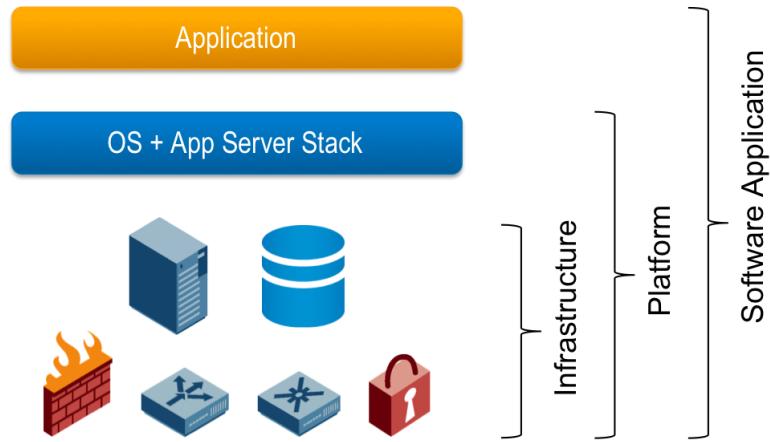


FIGURE 10: SaaS ARCHITECTURE COMPONENTS (Zhen, 2008)

- **Infrastructure Layer** or hardware layer consists of traditional computing and networking resources, including data center, hardware, servers, network equipment and application programming interface (API), which are all required to support operations.
- For the efficient and effective deployment of the resources in the infrastructure layer, the latter must be enriched with some additional middleware, which composes the **Application Platform Layer**. This second layer incorporates specific tools (e.g. Operating System, Application Server, programming language, etc.) that are responsible for the integration of and interaction between the infrastructure components and that support the delivery and development of the postulated software application as well. Furthermore, the middleware (e.g. MySQL) is crucial for the successful data integration in the management of the database systems.
- Finally, there is an **Application Layer**, covering the actual development, commercialization and delivery of the software application.

b. Maturity model

Next to the three key basic considerations, namely connectivity – business continuity – security, which have to be kept in mind by the SaaS architect during the development of the required SaaS infrastructure, the SaaS architect must also decide on the design of the SaaS application, determining the most appropriate maturity level (see FIGURE 11). The choice of the suitable maturity level depends on how **scalable**, **multi-tenant-efficient** and **configurable** the SaaS application must be in order to meet all the functional requirements, defined by the developers and requested by the customers.

- **Scalable** application is able to handle and to support the required quality of service as the system load increases. In other words, it is meant to use application resources in a more efficient and effective way.
- In a **multi-tenancy** environment, multiple customers share the same application, running on the same operating system, on the same hardware, with the same data storage mechanism. The distinction between the customers is achieved during application design, so that customers do not share or see each other's data. (Multitenancy, 2010)
- **Configurable** application allows a certain level of customization via metadata services, which are “[...] responsible for managing application configuration for individual tenants” (Chong & Carraro, 2006a, p.12).

In the paper “Building Distributed Applications: Architecture Strategies for Catching the Long Tail”, Frederick Chong and Gianpaolo Carraro worked out a SaaS maturity model, pointing out that “[...] maturity isn’t an all-or-nothing proposition” (Chong & Carraro, 2006a, p.9). It means that a SaaS application can meet all the necessary functional requirements, without possessing all the three attributes, stipulated above. Dependent on technical and business preferences and requirements of the SaaS developers and customers, the SaaS architect must decide which of the three attributes must characterize the application and consequently choose between four distinct maturity levels (see FIGURE 11).

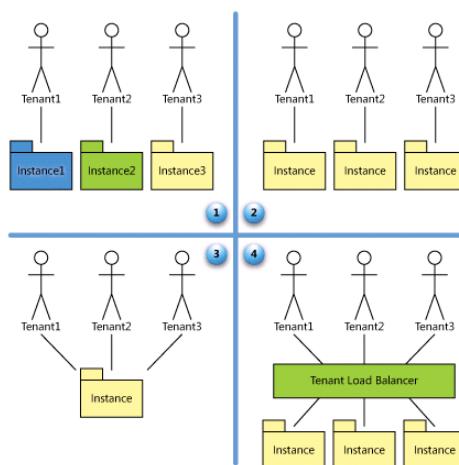


FIGURE 11: FOUR LEVEL SAAS MATURITY MODEL
(Chong & Carraro, 2006a)

- **Level I: Ad Hoc/Custom**

This maturity level is comparable to the traditional Application Service Provider (ASP) business model, in that “[...] each customer has its own customized version of the hosted

application and runs its own instance of the application on the host's servers" (Chong & Carraro, 2006a, p.10).

- **Level II: Configurable**

The second maturity-level provides greater program flexibility through configurable metadata, so that many customers can use separate instances of the same application code. This allows the vendor to meet the different needs of each customer through detailed configuration options, while simplifying maintenance and updating of a common code base. (Software as a Service, 2010)

- **Level III: Configurable, Multi-Tenant-Efficient**

By adding the multi-tenancy attribute to the previous level, SaaS architect increases the efficiency of the resources exploitation by hosting a single instance, which serves all the customers. In order to ensure that the data of each customer are kept apart from other customers' data, SaaS provider must elaborate appropriate authorization and security policies. A major disadvantage of this approach is the limited scalability of the application. This poor scalability can eventually be improved by scaling up or, with other words, by switching to a more powerful server.

- **Level IV: Scalable, Configurable, Multi-Tenant-Efficient**

If scaling up measures, undertaken on the previous level in order to positively influence the application's scalability, cannot be accomplished in a cost-effective way, the SaaS architect must consider the implementation of the highest maturity level. At this level, the scalability is added through a multitier architecture supporting a load-balanced farm of identical application instances, running on a variable number of servers. The provider can increase or decrease the system's capacity to match demand by adding or removing servers, without the need for any further alteration of applications software architecture (Software as a Service, 2010).

c. Data-architecture

One of the major differences of SaaS with on-premises software is the fact that all customers' data, used and processed during the exploitation of the application, is saved at the database system of the software provider.

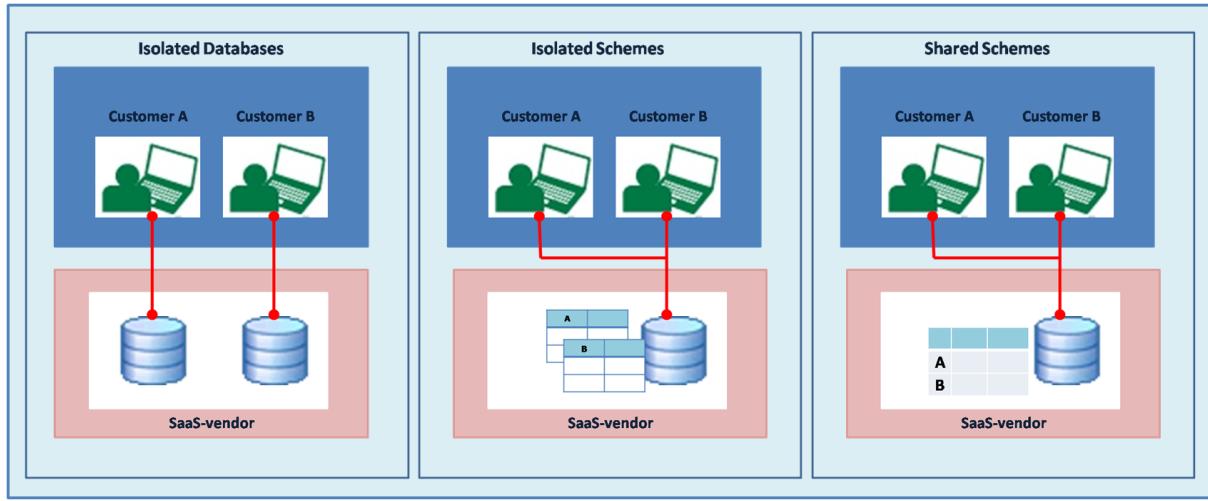


FIGURE 12: VARIOUS DATA ARCHITECTURES OF SAAS (Chung, 2008)

As can be seen in FIGURE 12, the latter has a choice between three possible data architectures (Chung, 2008):

- The software vendor provides each customer with **isolated database**, which is not accessible by other customers.
- Each customer is attributed to a personal **isolated scheme**, stored in the common database.
- Each customer has a personal customer-ID, attributed to the **shared schemes** and stored in the common database.

The choice of the appropriate data-architecture depends on several business and technical considerations, listed below (Chong, Carraro, Walter, 2006):

- **Economic Considerations**

In order to make a right decision on the appropriate data-architecture, a trade-off must be made between time-to-market on the short term and economies of scale on the long run (see FIGURE 13). If it is critical to bring the application to the market as soon as possible, the isolated approach would be the best solution, in addition requiring fewer funds than the shared alternative. Otherwise, the shared database solution entails larger development effort due to the complexity of the system, resulting in higher initial cost. However, on the long term the SaaS provider benefits from the economies of scale by supporting a large amount of tenants per server, which entails lower operational costs.

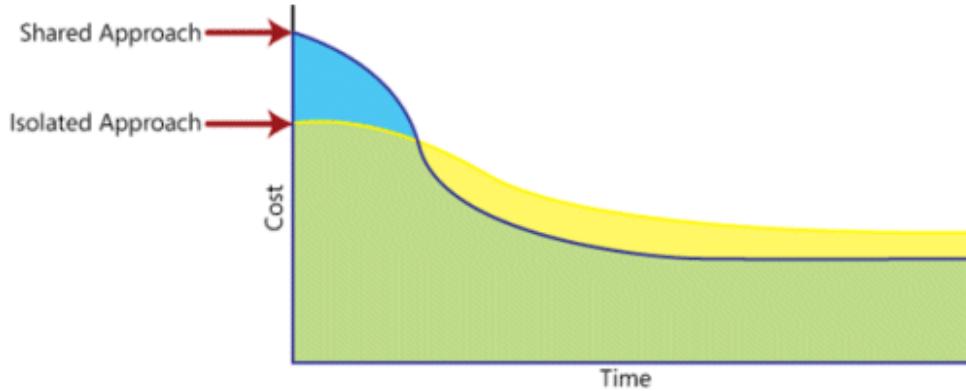


FIGURE 13: COST OVER TIME FOR A PAIR OF SAAS APPLICATIONS (Chong et al., 2006)

- **Security Considerations**

Seen the fact that all the customers' data is stored externally from the enterprises, the customers will have high expectations about the security. Consequently, strong data safety must be insured by the system and guaranteed in the Service Level Agreements (SLAs). From the architectural point of view, both approaches can provide a suitable level of security, although the shared data-architecture requires the employment of more sophisticated design patterns.

- **Tenant Considerations**

As presented in FIGURE 14 the data architecture decision is affected by the *number*, *nature* and *needs* of the tenants in various ways.

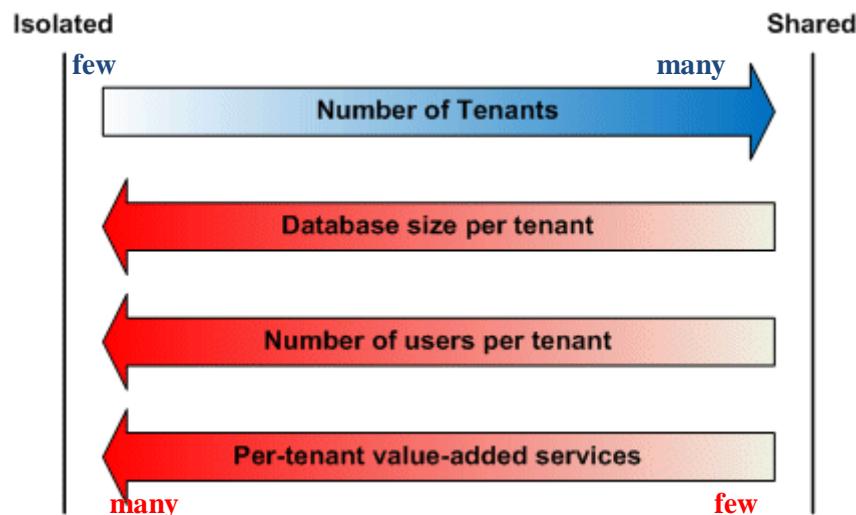


FIGURE 14: TENANT-RELATED FACTORS AND HOW THEY AFFECT
"ISOLATED VERSUS SHARED" DATA ARCHITECTURE DECISIONS (Chong et al., 2006)

- It is very important to make a sound estimation of the number of tenants the SaaS provider is expecting to target. Given the fact that forecasts are always wrong, F.

Chong et al. advise to “[...] *think in terms of orders of magnitude: are you building an application for hundreds of tenants? Thousands? Tens of thousands? More?*” (Chong et al., 2006, p.6). The larger the expected customer base, the more likely it is to consider a more shared approach.

- Furthermore, if the SaaS provider expects that the majority of the customers will store very large **amounts of data**, the isolated database option would be the best solution.
- As in the case of the number of tenants, the larger the estimated **amount of end users per tenant**, the more suitable an isolated approach seems to be in order to meet the needs and requirements of those end-users.
- Finally, if the SaaS-vendor considers offering some per-tenant **value-added services** as for example per-tenant back-up and restore capabilities, the more isolated option provides easier and less sophisticated implementation procedures.

d. Authentication system

As already mentioned in the beginning of this chapter (*supra*, p.24), it is very important to develop a decent authentication system, required for the secure provision and authentication of the user accounts. Dependent on the purpose of application and the customers' and end-users' needs, the SaaS designer may opt either for *centralized* or *decentralized* authentication system (Chong & Carraro, 2006a).

- As can be seen on FIGURE 15, a **centralized** authentication system requires a relatively simple authentication infrastructure, which does not involve any changes to the customers' infrastructure.

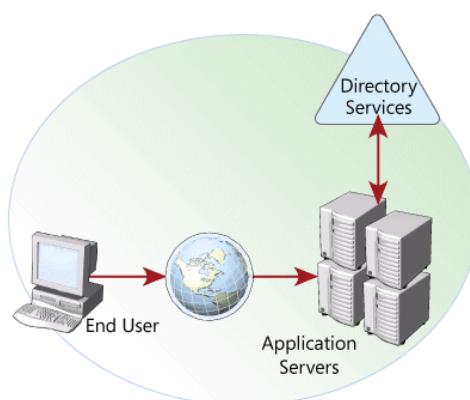


FIGURE 15: CENTRALIZED AUTHENTICATION SYSTEM (Chong & Carraro, 2006a)

With this approach, a central user account database, which serves all application clients, is managed by the software provider. The actual authentication is executed by the application through the verification of the provided credentials on the validity issue against the central directory.

- In a **decentralized** authentication system, a federation server⁸ is installed within the customer's network that interfaces with the customer's own enterprise user-directory service. This federation server has a trust relationship with a corresponding federation server located within the SaaS provider's network (see FIGURE 16). As described in the paper "Software as a Service (SaaS): An Enterprise Perspective" "[...]When an end user attempts to access the application, the enterprise federation server authenticates the user locally and negotiates with the SaaS federation server to provide the user with a signed security token, which the SaaS provider's authentication system accepts and uses to grant the user access" (Chong & Carraro, 2006b, p.14).

This decentralized approach is ideal in case single sign-on⁹ (SSO) is important, because authentication is handled behind the scenes, and it does not require the user to remember and enter a special set of credentials.

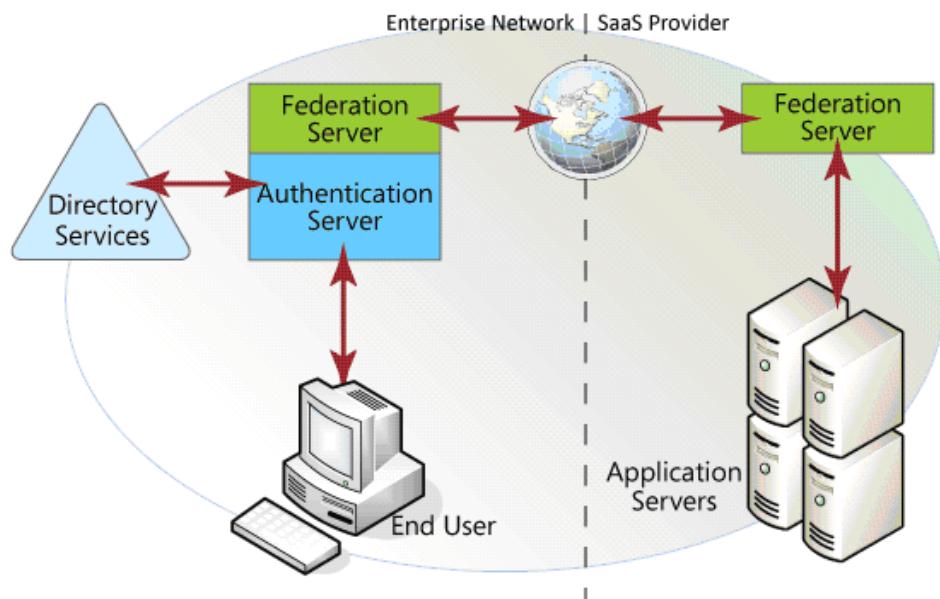


FIGURE 16: DECENTRALIZED AUTHENTICATION SYSTEM (Chong & Carraro, 2006a)

⁸ By creating a federation server, one provides a means by which the organization can engage in web single-sign-based communication with another organization (that also has at least one federation server) and, when necessary, with the employees in own organization (who need access over the Internet).

⁹ **Single sign-on (SSO)** is a property of access control of multiple, related, but independent software systems. With this property a user logs in once and gains access to all systems without being prompted to log in again at each of them. (Wikipedia)

However, the decentralized authentication system requires individual trust relationship with each customer, having his/her own federation service, leading to greater complexity and as a consequence higher operating costs compared to the centralized approach.

There also exists the possibility to combine both approaches by using the centralized authentication system for smaller tenants, while granting the decentralized system to the larger companies, who are ready to pay extra fee for the single sign-on experience.

2.3.3. Key partnerships

In addition to the three key considerations (economic, tenant and security), the choice of the most appropriate maturity level and data-architecture, the final very important issue to be considered by the independent software vendor is whether to **build and maintain** each layer on its own or to **outsource** some or all layers in order to focus on the core capabilities.

In the former case, the Independent Software Vendor opts for the **vertical integration** (see FIGURE 17), resulting in considerable initial investment and ongoing maintenance and personnel costs.

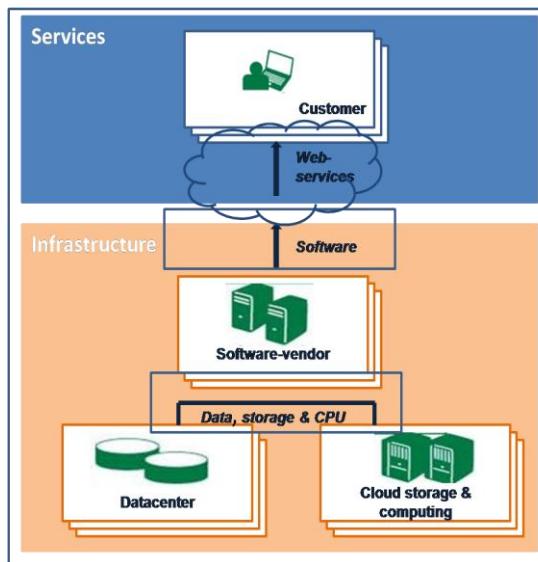


FIGURE 17: VERTICALLY INTEGRATED SaaS-VENDOR
(Chung, 2008)

If software vendor opts for outsourcing option, the choice between two options exists. Firstly, it is possible to go in **partnership** with the providers of IaaS (e.g. Cisco) and PaaS (e.g. Amazon.com) such that only the third application layer is developed internally (see FIGURE 18).

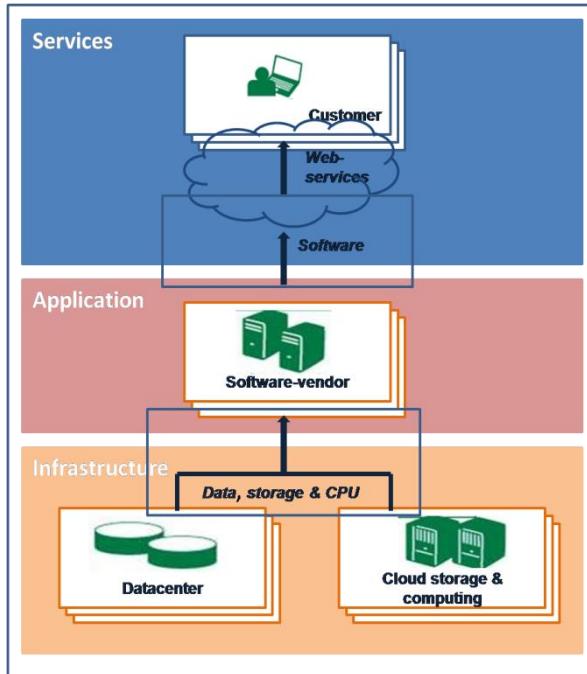


FIGURE 18: OUTSOURCING OF IAAS AND PAAS (Chung, 2008)

Secondly, there also exists an opportunity to act as a **SaaS-integrator**, outsourcing all the three layers and ultimately focusing on the final delivery of the service to the customers (see FIGURE 19). The choice of the appropriate architecture model depends on the goal and available resources and capabilities of the software provider.

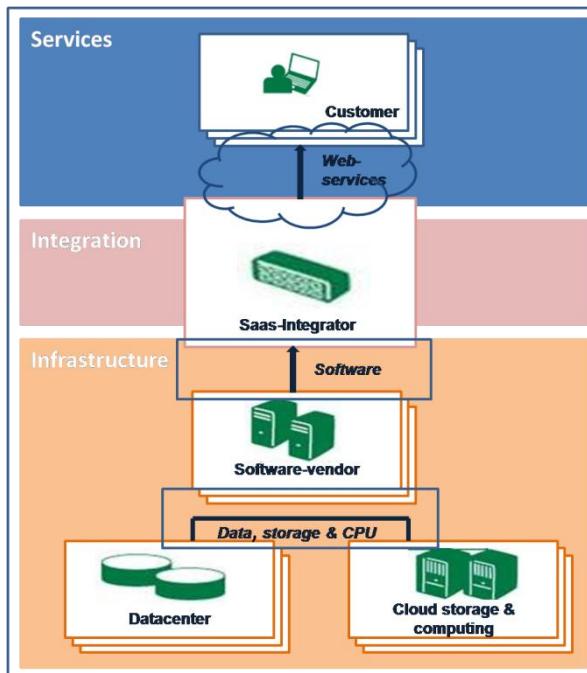


FIGURE 19: ISV AS SAAS-INTEGRATOR (Chung, 2008)

2.4. Finance

In the business literature many authors¹⁰ condense a business model to “[...] *commercial relationship between a business enterprise and the products and/or services it provides in the market*” (Hawkins, 2001, p.3). Simplification as these allows focusing on the core elements of the firm’s profitability: the **cost** aspect and the **revenue generation** potential. The former element must be mastered in the most efficient and effective way, while the potential of the latter must be utterly exploited, without leaving any value on the table. Those two factors are extremely important in the SaaS context primarily due to the novelty aspect of SaaS business model and its innovation ecosystem; and consequently the lack of experience of doing business under these new circumstances. Cost and revenues must be structured in such a way that a business model is able to sustain itself in the long term.

2.4.1. Cost structure

Cost elements play a two-fold role in the SaaS provider survivorship. On the one hand they determine the initial investments and the costs associated with services’ marketing and delivery. On the other, cost structure stipulates the (minimum) price of the offered services, this way creating or ruining firm’s competitive advantage and profitability. Recent interviews in *InformationWeek*¹¹, with industry leaders (e.g. SAP¹² CEO Bill McDermott, SAP co-CEO Leo Apotheker), unveil that “[...] *it is difficult to make money on SaaS*” (Weier, 2009). At the same time success stories of NetSuite¹³, Workday¹⁴ or Salesforce.com¹⁵ report double-digit revenue increases (see FIGURE 20) corroborated with recent Reuter’s update:

“[...] *Fourth-quarter revenue at the software maker (Salesforce.com) - which competes with SAP AG, Microsoft Corp, Oracle Corp and NetSuite In - rose 22 percent to \$354 million, compared with the average analyst estimate of \$342 million.*” (Finkle, 2010)

¹⁰ As for example Afuah, A. and C. Tucci (2003) in “Internet Business Models and Strategies”, Boston, McGraw Hill Rappa, M. (2001) in “Managing the digital enterprise - Business models on the Web”, North Carolina State University.

¹¹ InformationWeek.com delivers breaking news, blogs, high-impact image galleries, proprietary research as well as analysis on IT trends, a whitepaper library, video reports and interactive tools, all in a 24/7 environment. URL: <<http://www.informationweek.com>>

¹² SAP currently focusing on SME-businesses with “Business ByDesign software” product offered on SaaS-bases

¹³ More on the company is to find on <<http://www.netsuite.com/portal/home.shtml>>

¹⁴ More on the company is to find on <<http://www.workday.com/>>

¹⁵ More on the company is to find on <<http://www.salesforce.com/eu/>>

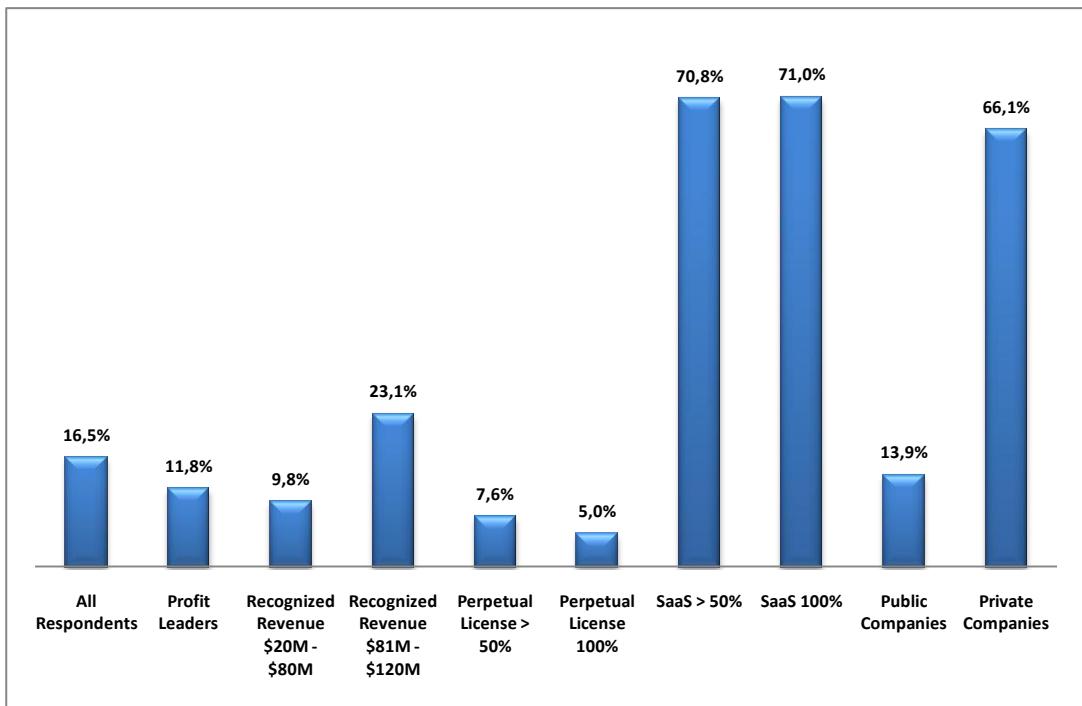


FIGURE 20: TOTAL RECOGNIZED REVENUE GROWTH (2006 vs. 2005) (Nair, 2008)

However, revenue (-growth) is a necessary, but not a sufficient condition for the sustainability and viability of a firm. Profit is the key to success. Surprisingly, but even listed and best-of-breed vendors in the SaaS industry (e.g. NetSuite, Rightnow Technologies Inc, China.com Inc, Epicor Software Corporation, etc.) are still suffering from negative profit numbers (see FIGURE 21), and, in some cases, even negative EBITD (see APPENDIX 2.1: Financial position of quoted SaaS companies).

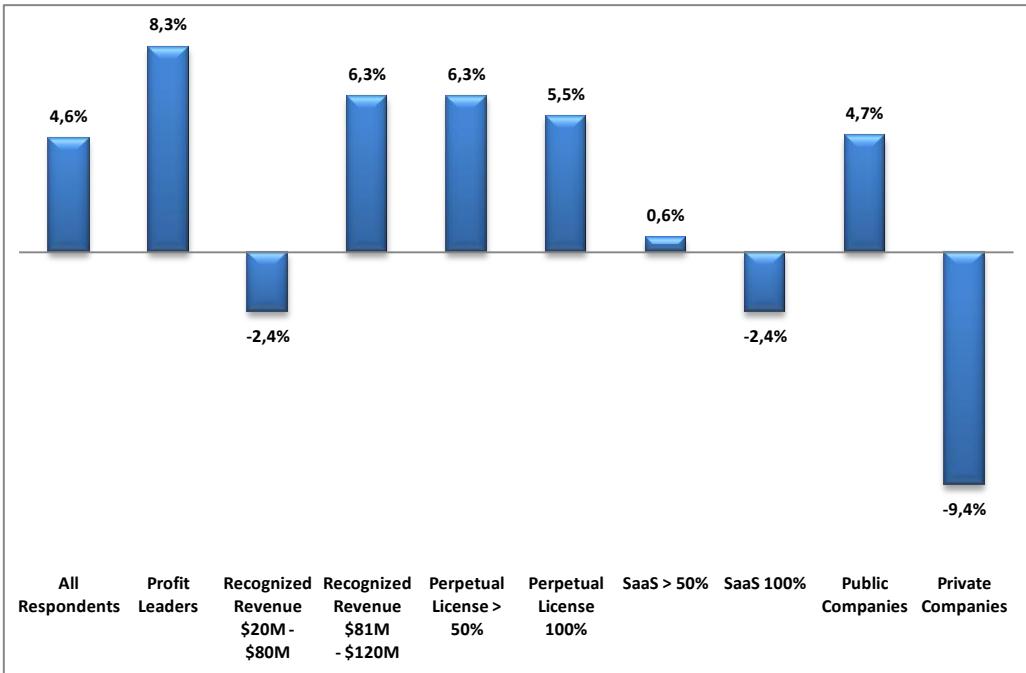


FIGURE 21: NET INCOME BEFORE TAXES AS A PERCENTAGE OF RECOGNIZED REVENUE (Nair, 2008)

To understand this paradox (of high revenues but negative profitability), (pure) SaaS vendor's (Salesforce.com) cost structure is compared to the one of the traditional (licensed) software vendor (SAP) (Why Do SaaS Companies..., 2009). In general, the business model ontology distinguishes following elements (Maître & Dunod, 1999):

- Cost of goods sold and operating costs, which are further decomposed in research and development (R&D)
- Sales and marketing (S&M)
- General and administrative (G&A) expenses

In addition, SaaS providers will have “[...] additional operational costs of hosting, disaster recovery, system management and so forth, much of which is amortized as the number of users grow” (Desisto & Paquet, 2007, p.3).

- **Sales and Marketing costs**

A widespread assumption in the industry is that SaaS vendors enjoy lower operational costs (as a percentage of sales) in particular sales and marketing and R&D.

However, our observation shows the opposite. Salesforce.com spends almost 54 cents to generate 1 dollar in revenue (expected yearly growth 44%), while SAP only 29 cents (expected yearly growth 17.5%). Our finding is also supported by KippsDeSanto&Co

study (Yim, 2009) where 20 publicly-traded SaaS companies and over 110 publicly-traded on-premise software companies were compared (see FIGURE 22).

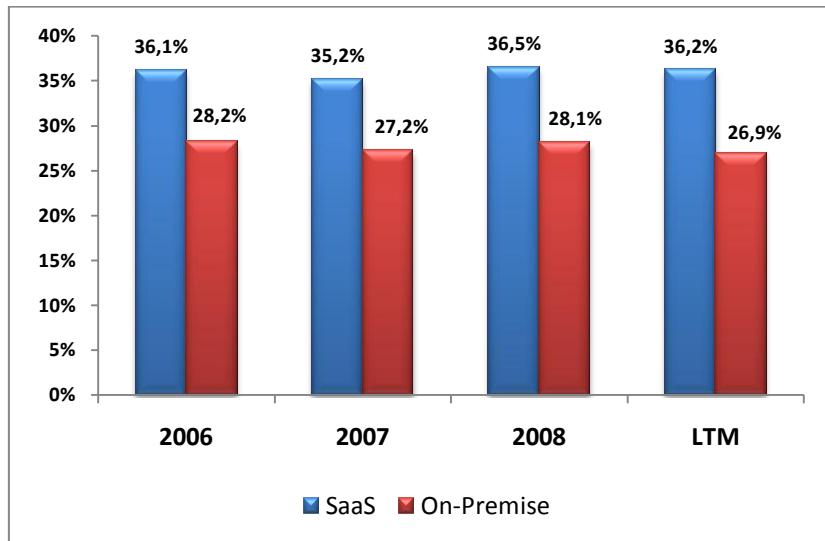


FIGURE 22: MEDIAN S&M AS % OF REVENUE (Yim, 2009)

Another interesting study by River Cities Capital Funds states that “[...] *sales and marketing is typically the largest and most widely variable expense component of a SaaS company’s cost structure, ranging from approximately 19%-500% of revenue below \$30 MM in revenue*” (2009 Software as a Service Valuation.., 2009, p.15). However refining, that concrete percentage allocation depends on factors as:

- Stage of a company’s development (S&M percentages decline as the **business matures**)
- **Average selling price**, which is correlated with the number of customers. The higher the average selling price, the smaller the customers’ pool, the lower S&M percentages for given revenue level.
- Accepted **GAAP standards** and practices (“[...] *sales and marketing costs remain persistently high as Generally Acceptable Accounting Principles (GAAP) force recognition of expenses in advance of subscription revenue, as well as the continual requirement to replace churning customers*” (Bolick, Gilbert, Sood, 2006).

- **General and Administrative costs**

Following nowadays philosophy of elimination of non-production related costs and efficiency frontier approximation, both set-ups (SaaS and on-premise) have comparable general and administrative expenses. Salesforce.com spends 16 cents for 1 dollar of revenue and SAP 17 cents. However, the industry's amount spent (between 19% and 13%) is in function of the **firm's revenue** (Comparing Software Operating Ratios..., 2009) (the greater a firm's revenue, the lower G&A expenses), where G&A expenses represent “[...] *expenses to manage the business*” (e.g. officer salaries, legal and professional fees, utilities, insurance, depreciation of office building and equipment, etc.) (Income Statement, 2010)).

The above statement may sound contradictory, but taking into account that the younger SaaS vendors are confronted “[...] *with high, upfront overhead costs and complexity of managing SaaS accounting and planning*” (A Closer Look at G&A, 2008, p.1), while generating only modest revenues, what leads to comparable conclusion.

- **Research and Development costs**

Simplicity, introduced by the SaaS delivery model, reduces the R&D expenditures compared to the off-line software providers for several reasons.

- While on-premise provider's “[...] *heterogeneous costs including hardware, operating systems, databases and middleware requirements, as well as the multiple versions of each possibility, must be supported.*” (Desisto & Paquet, 2007, p.2); SaaS providers incur lower expenses as they have to develop, test and support fewer combinations of requirements.
- SaaS vendors “[...] *obtain better visibility into customer's usage patterns and feedback, which enables the rapid development cycles*” (River Cities Capital Funds, 2009).

With result that Salesforce.com spent 10% of revenue, opposite to 21% expended by SAP. The median industry values (see FIGURE 23) validate the rationale, but with less remarkable differences.

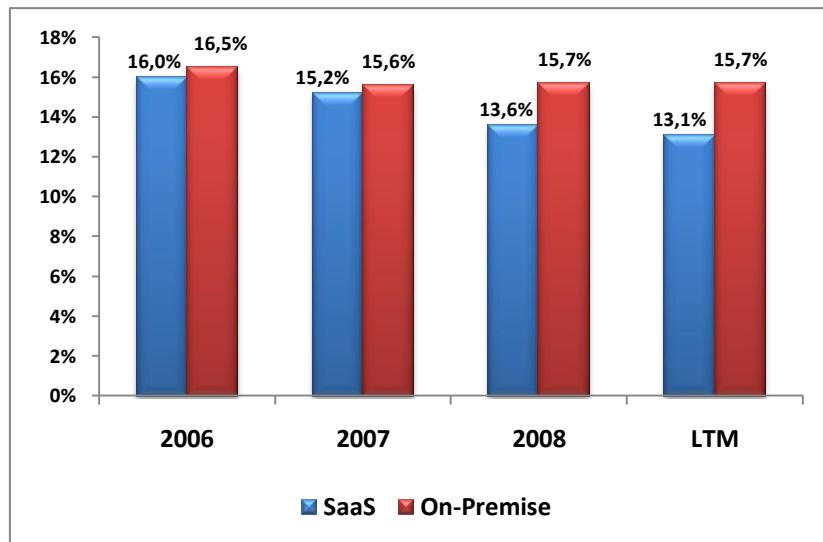


FIGURE 23: MEDIAN R&D AS % OF REVENUE (Yim J, 2009)

However, again median results must be taken with a grain of salt, as industry's percentages range (between 0% and 57%) in function of:

- Development stage (the more mature a solution, the lower R&D expenses)
 - Offering's level of technical complexity (the higher the inherent solution complexity, the higher the required R&D investments).
- **Cost of revenue¹⁶**

Less obvious and less known expense is the cost of revenue. Generally related to the service delivery to the end-customers, including bandwidth, hardware (amortized) & hardware related expenses, operations staff (if applicable), storage, backup & recovery, licenses, co-location (real estate, electricity, cooling, etc.), product support. In order to provide a reliable, stable, customizable and robust business application, SaaS vendor must make a considerable investment. 13% of revenue as yearly expense for Salesforce.com, while 22% for SAP. However, percentages for Saleceforce.com are more an exception, than an industry rule where percentages fluctuate between 24% (Taleo¹⁷) and 41% (DealerTrack¹⁸) of the revenue, biasing the total representation (Schuller, 2007).

¹⁶ Taking into account that software is provided on service bases, the traditional (associated) accounting name COGS (cost of goods sold) is inappropriate.

¹⁷ Taleo offers on demand talent management solutions to assess, acquire, develop, and align the workforce for improved business performance. URL: <<http://new.taleo.com/>>

¹⁸ DealerTrack offers intuitive and high-value software solutions, which enhance efficiency and profitability for all major segments of the automotive retail industry, including dealers, lenders, OEMs, agents and aftermarket providers. URL: <<https://www.dealertrack.com/>>

- **Capital expenditures**

In addition, SaaS vendors' capital expenditure (investments in infrastructure in order to host customer's data) varies between 2% to 15% of revenues. (2009 Software as a Service Valuation, 2009)

2.4.2. Revenue streams

Before proceeding with the discussion on the possible revenue streams within SaaS business model, we follow fostered approach. We will first provide the theoretical background on the revenue model in general and its constituent units, subsequently focusing on the practical realm of the SaaS day-to-day practices.

In the business model ontology, following definition has been outlined: “[...] *revenue model measures the ability of a firm to translate the value, it offers to its customers, into money and incoming revenue streams. The revenue model can be composed of different revenue streams, which can all have different pricing mechanism. The revenue streams and pricing elements define what mechanism is used to determine the price of the value offered*” (Sixteen Ventures, 2009).

Within SaaS context it is important to underline elements as **firm's ability to translate the customer's value into revenue** and **mechanism used to determine the price**. Given the large variety of substitute products under on-premise (licensed) software- and hosted solutions, SaaS providers are under constant pressure of superior value delivery to its customers.

Nevertheless, it is erroneous to think that SaaS providers have “(monthly) subscription fees” as the only revenue source. In the presentation “SaaS Revenue Modelling: Details of the 7 Revenue Streams”, 16 Ventures discerns 7 different revenue streams that a SaaS provider can generate (SaaS Revenue Modelling, 2010). The explanation, behind this revenue potential, lies in the different (compared to legacy software) approach between producers, consumers and ecosystem; and different relationship between marketing, technology, revenue model, intellectual property and network centricity.

Potential revenue streams are reflected in FIGURE 24.

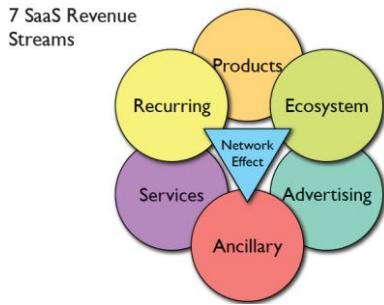


FIGURE 24: SaaS POTENTIAL REVENUE STREAMS (SaaS Revenue Modelling, 2010)

Revenue streams are divided in three groups in function of the revenue stream scalability index, distinguishing *scalable* (ecosystem, recurring, ancillary, network effect), *less-scalable* (products, advertising, services) and *not scalable* in the most cases (advertising). “[...] Scalability refers to margins per revenue stream: the more a revenue stream can benefit from economies of scale and improve margins with growth, the more “scalable” the revenue stream” (SaaS Revenue Modelling, 2010, slide 25).

Recurring revenue stream represents the most traditional revenue source which is represented for example under subscription-based¹⁹, usage-based²⁰ or transaction-based²¹ payments for the services. It is predictable in terms of receipt and time, suited for up-selling and “[...] flexible in pricing for different markets” (SaaS Revenue Modelling, 2010). Yet, the downsides are lower collected amount (compared to up-front payment from licensed software model), sustainability highly dependent on churn and customer retention rate (constantly focusing on the growth of CLTV²² / ARPU²³) and high initial CAC²⁴ ratio, eroding vendor’s creditworthiness.

Revenues coming from **SaaS ecosystem** itself, derive from the relationships between “[...] the users, developers and stakeholders [...] functioning together with all of the non-physical factors of the internet” (Lehmann, 2008, slide 7) such as affiliate sales, channels, APIs (application programming interface), etc. The ecosystem improves the value for the partners, and at the same time exposures firm’s services to ancillary and adjacent markets, however forewarning for unwanted interdependencies and customer’s value chains non-transparency.

¹⁹ As for example HRM solutions offered by Workday; URL: <<http://www.workday.com/solutions.php>>

²⁰ As for example, solutions offered by Savvis, Inc;

URL: <http://www.savvis.net/en-US/Solutions/Software_Service/Pages/Home.aspx>

²¹ As for example, solutions offered by Paynet Secure; URL: <<http://www.paynetsecure.net/saas-billing.php>>

²² **CLTV** (Customer Life Time Value) = the net present value of the recurring profit streams of a given customer less the acquisition cost (Johnson, 2008)

²³ **ARPU** (Average Revenue per User) = a measure of the revenue generated per user or unit. Average revenue per unit allows for the analysis of a company's revenue generation and growth at the per-unit level, which can help investors to identify which products are high or low revenue-generators. (Johnson, 2008)

²⁴ **CAC** (Customer Acquisition Cost) = determines the payback time on sales and marketing investment. (Botter, 2009)

Ancillary revenues can be defined as direct derivative from the core offer. Within SaaS setup customers are not required to invest in own hardware and infrastructure, but they are still obliged to make initial system set-up or installation efforts in order to run the system. For these services, SaaS vendor can charge an additional (processing-, setup-, etc.) fee or provide a discount, on a service with no or limited underlying cost, in order to attract potential new customers. Ancillary revenues can be considered autonomous, as long as the set-up costs are detached from the charged monthly payment.

Revenues originating from the **network effect** are the virtue of the knowledge generation and information trading between consumers, customers and ecosystem. The abstract description of this kind of revenues is materialized in the aggregate data reports, industry benchmarks or API's. In other words network effect benefits originate from the SaaS installed base and are bigger as the consumers' pool grows. Collection of the information and standardization of the business practices adds value to the ecosystem in general and leverages ecosystem's partners to develop reports that “[...] increase exponentially in value as usage of the system grows” (SaaS Revenue Modelling, 2010). Yet, the risk of vendor's intentions disclosure must be taken into account as potential opportunity cost. Disregarding the fact that published information might be (mis-)used by the competitors, might invade vendor's competitive advantage.

Under **products revenue** category fall all the supporting (physical) services the vendor offers in order to make customer's system operational. It is unusual for SaaS providers to sell/install equipment, devices, appliances or hardware (partially due to additional overhead and support costs; and single-tenant set-up), but exceptions do exist²⁵. The advantage in this case is that vendor ties the customer, assuring this way sustainability and long term revenue generation with higher margins.

Notwithstanding that early (Phase I) SaaS-based solutions as Salesforce.com are obvious in use and self-explicable user interface; new generation (Phase III)²⁶ requires much more (individual) **counselling and support**. This lays the foundation for additional revenue stream, including content creation, training, etc. However, one-to-one or one-to-few approach might financially penalize the SaaS-vendor due to the scalability and efficiency loss.

Finally, the seventh potential revenue stream within SaaS business model is based on **advertising**. According to Sixteen Ventures, revenues from ads are preferably to consider only

²⁵ As for example products/services offered by Pemrose, URL: <<http://pemrose.com/default.aspx>> or Single Point of Contact, URL: <<http://www.singlepointoc.com/index.asp>>

²⁶ An example of Phase III representative is Kinaxis with SCM SaaS solution, URL: <<http://www.kinaxis.com/supply-chain-customer-services/>>

in the case when advertisement is the core business of the firm that provides SaaS-based solutions. For instance, Google Inc. provides free of charge (standard) Google applications²⁷ (e.g. Google Mail and Google Calendar, Google Docs and Google Sites), but sustains the viability through extensive advertisement incomes.

2.4.3. Conclusion

Financial structure of a SaaS business model offers a lot of opportunities (prosperous revenue streams), but at the same time contains underwater rocks (high operational costs, limited cash flow availability due to subscription mechanisms), this way slowing down or prohibiting positive profit generation.

Most industry estimates suggest that SaaS companies require:

- approximately 50% to 70% more capital (see FIGURE 25) to achieve cash flow breakeven (2009 Software as a Service: Valuation., 2009)
- 1.75 times more revenue to hit profitability (Nair, 2008)
- annual churn rates below 15%
- margins in the 70%+ range
- 1.6 times more time to get liquid compared to on-premise software company counterparts (Nair, 2008)

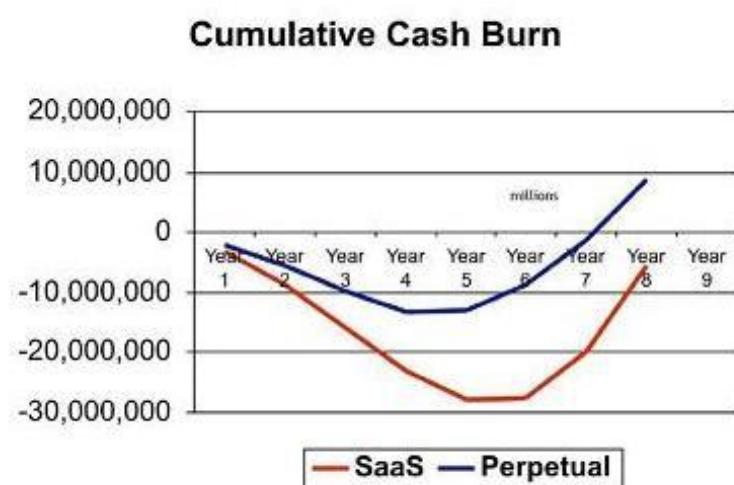


FIGURE 25: CASH BURN: SAAS VS. PERPETUAL MODEL (Gardner, 2008)

²⁷ More on Google Apps is to find on <<http://www.google.com/apps/intl/en-GB/business/index.html>>

3. SaaS ecosystem

For a potential or already existing ISV, who is considering the provision of SaaS, is of great importance to understand the principles of the SaaS business model, which we have pointed out in the previous part. Though, this understanding is not sufficient to enter and to succeed on the SaaS market and it must be enriched with the exhaustive analysis of SaaS ecosystem.

As we have not found any definition for “SaaS ecosystem”, therefore we decided firstly to take a look at what is actually meant by the term “ecosystem” as such. As one can still remember from the courses of biology, the ecosystem is defined as “*a complex set of relationships of living organisms functioning as a unit and interacting with their physical environment*” (Basic terms of disaster risk reduction, 2003). Starting from the world of biology and applying this definition to the world of Software as a Service, we have made an attempt to formulate our own description of SaaS ecosystem, defining it as “*a complex set of relationships of all SaaS enablers, users, developers and stakeholders functioning as a system and interacting in the physical and virtual SaaS environment*”.

Analysing this definition, it becomes clear that the SaaS vendor or even maybe the potential venture capitalist, who considers investing in Software as a Service industry, must open up the internal borders of SaaS and take into account the role and the power of all parties and the influence of all the factors in the SaaS environment.

From our point of view, **Porter’s Five Forces model**, developed by Michael E. Porter²⁸, would be the most appropriate one to accomplish the analysis of SaaS ecosystem and to assess the competitive intensity and therefore the attractiveness of a SaaS market.

3.1. Porter’s five forces analysis of SaaS innovation ecosystem

In his model, Porter makes a distinction between five competitive forces, which may influence the attractiveness of a certain industry. These forces include three forces from 'horizontal' competition: *threat of substitute products*, *threat of established rivals*, and *the threat of new*

²⁸ Michael Eugene Porter (born 1947) is the Bishop William Lawrence University Professor at Harvard Business School. A leading authority on company strategy and the competitiveness of nations and regions, Michael Porter’s work is widely recognized in governments, corporations, non-profits, and academic circles across the globe. His main academic objectives focus on how a firm or a region can build a competitive advantage and develop competitive strategy. One of his most significant contributions is the “five forces” analysis.

entrants; and two forces from 'vertical' competition: *the bargaining power of suppliers* and *the bargaining power of customers* (see FIGURE 26). (Porter Five Forces Analysis, 2010)

Hereafter follows a comprehensive analysis of each of the five forces applied to the SaaS ecosystem.

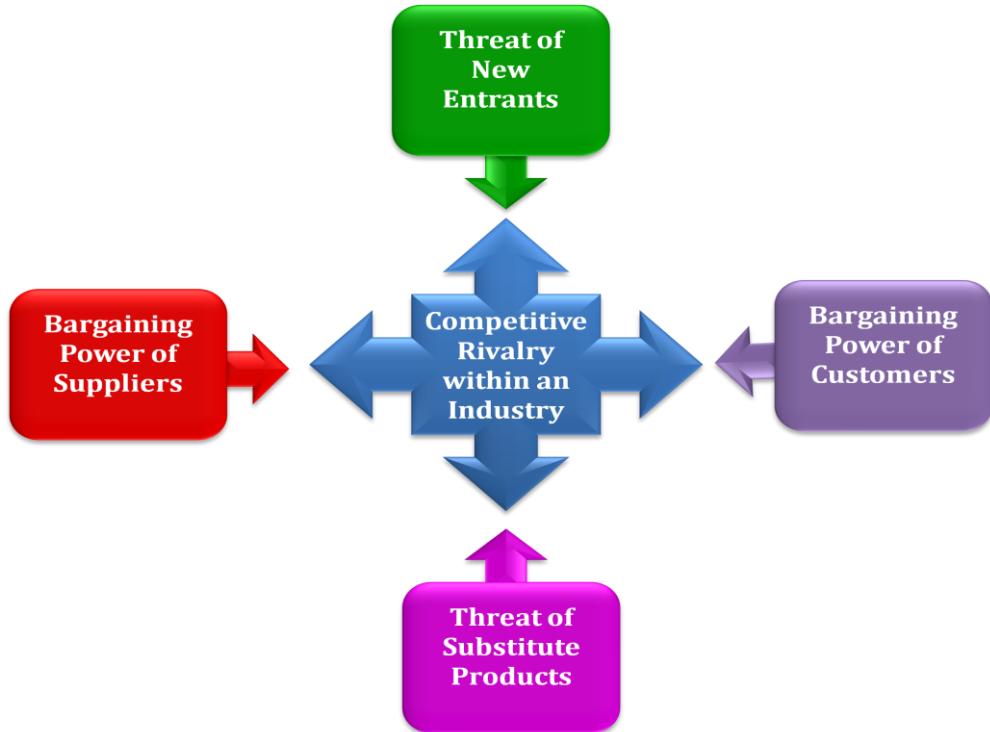


FIGURE 26: PORTER'S FIVE FORCES (Porter Five Forces Analysis, 2010)

3.1.1. The threat of substitute products or services

The first important issue to analyze, before entering the SaaS market, is the existence of the **alternatives** to the offering that the ISV is planning to provide to their prospective customers. During the exploration of the software delivery market, we have identified three major **software delivery models** as alternative to the SaaS offering. As can be seen from the TABLE 1 below, the customer can either prefer the traditional *on-premise* software, or switch to the alternative *on-demand* solutions, as for example more outdated and less successful services offered by ASPs, or choose a hybrid solution in the form of Software plus Services, recently introduced by Microsoft Corporation.

On-premises software	ASP	SaaS	Software + Services
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TABLE 1: SOFTWARE DELIVERY MODELS

Furthermore, the SaaS vendor must keep in mind that the customers' choice is influenced by such factors as functionality, performance, price/quality considerations, switching costs, the ease of use and value of the software solution as perceived by the customer.

a) On-premises software

In the time that the internet craze has not yet entered the business and the public world in the late 1990's, there existed only one way of delivering the software to the customers, namely selling the CD-ROMs with software under the software license agreement. In this case, the application is installed and run on the computers "*on the premises*" of the person or organisation (On-premise software, 2010). Dependent on the software's sophistication, the installation and the maintenance of the application is executed either by the independent software provider (e.g. MRP) or the customer him/herself (e.g. Microsoft Office). Consequently, the customer must possess the minimum knowledge of the information technologies or make the use of the IT professionals in order to install and to maintain the software. This means that the companies, which extensively use various applications as enablers or supporters of their business activities, need specialized personnel, who are responsible for the appropriate execution and support of IT infrastructure and activities.

From the moment World Wide Web (WWW) became the integral part of our lives, there appeared the alternative for writing the software on the CD-ROMs. In particular, the providers of less sophisticated software (e.g. antivirus software) made the application available for download from the internet in the form of an executable file, which must then obviously be run and installed on the user's computer.

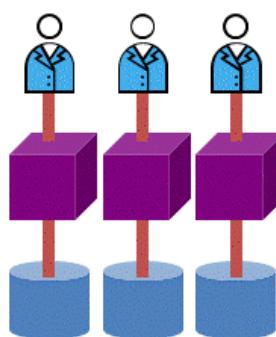


FIGURE 27: ON-PREMISES SOFTWARE MODEL (Cloud computing, SaaS and SOA, 2009)

Even though, many IT professionals and obviously the admirers of the on-demand software, characterize the traditional on-premises software as being "old-style" and "out-of-date", it is still

widely preferred in banking, finance and defense sectors, where the ability to supervise and secure the data, which are owned and controlled locally, is required (On-premise software, 2010).

b) Application Service Providers

At the end of the 1990's, the developments in the IT world and the popularization of the internet gave the birth to the new form of software delivery, called Application Service Provider (APS) Model. The core idea behind this model is to provide the application services via the Wide Area Networks (WANs) on a rental basis. Particularly, the ASP company hosts the application in secure *centrally located servers* and *licenses* it to multiple customers, using the principle of *single-instant, single-tenant architecture* (see FIGURE 28), resulting in some similarities with the first level of the SaaS maturity model (supra, p.25).

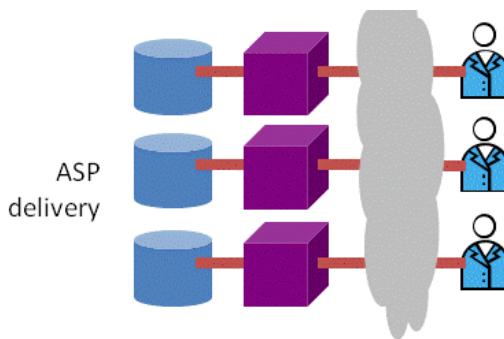


FIGURE 28: ASP DELIVERY MODEL (Cloud computing,SaaS and SOA, 2009)

As Lixin Tao²⁹ argues in his paper “Application Service Provider Model: Perspectives and Challenges”, ASPs are driven by three separate trends, being *selective outsourcing*, *application hosting* and *browser-based computing* (Tao, 2000). (see FIGURE 29).

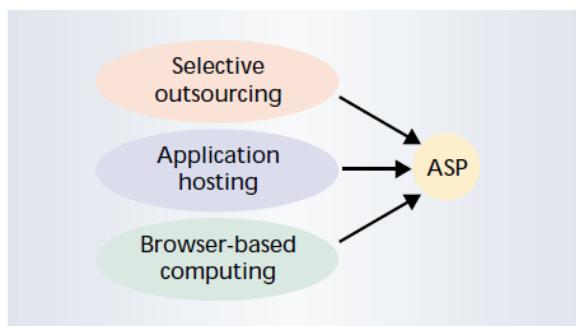


FIGURE 29: THE INGREDIENTS OF ASP (Tao, 2000)

²⁹ Lixin Tao is a tenured computer science professor at Pace University in New York, a member of IEEE (Institute of Electrical and Electronics Engineers) and ACM (Association for Computing Machinery)

- **Selective outsourcing**

In order to save the costs and to focus on the core activities, many companies tend to *selectively* outsource specific non-core and non-critical IT functions, ranging from data networking to application management. In parallel, this development “[...] combined with a trend toward fixed and per-user pricing, often levied in the form of a monthly subscription” (Tao, 2001, p.3). Consequently, there appeared *various* forms of ASP offerings, as for example application outsourcing, systems management outsourcing, infrastructure outsourcing, whole-environment outsourcing and subscription outsourcing (Tao, 2001).

- **Application hosting**

Going back into the history of Internet, one would discover that initially access and connectivity services and hosting services as well were offered by the same Internet Service Provider. After some time, the ISP market was divided into several segments, resulting in various ISPs targeting particular services. Those ISPs, who focused on the provision of hosting services and who saw the potential in switching to more sophisticated Web hosting services as for example e-commerce or messaging effectively became the ASPs. In addition, the ASPs market was extended by other application software vendors, who provided the Internet-based applications and services using the hosting model as well. As a result, the market of hosting services was broken up in several categories: Internet Web server hosting, application server hosting, e-business services, and Internet infrastructure services (Tao, 2001).

- **Browser-based computing**

If in the beginning, the web sites were characterized as being static and providing only the content in the form of words and images, during the internet craze at the end of 1990's the technology has already reached the **appropriate maturity level**, enabling the switch to more dynamic and interactive web sites. At the same time, “[...] a new generation of software vendors markets their applications as Web-based services, accessed directly over the Internet” (Tao, 2000, p.3). Those two developments resulted in the appearance of new “*browser-based computing*” development, which in addition to the relevant content provides complex online applications, satisfying the needs of targeted web-site audience. L. Tao makes in his paper a distinction between the following browser-based computing categories: network-based application vendors, Internet

business services, vertical industry Web sites, Internet marketplaces, and enterprise extranets (Tao, 2001).

As in the case of Software as a Service delivery model, ASP model is characterized by the multi-layered channel that enables the delivery of the software to the customer (see FIGURE 30).

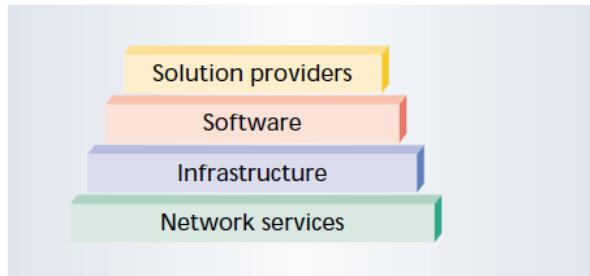


FIGURE 30: ASP CHANNEL STRATIFICATION (Tao, 2001)

At the first “*Network Services*” layer one can find the providers of basic communications (e.g. physical connections, routers and security applications), server centre resources (e.g. physical-security and maintenance services) and value-added Internet Protocol (IP) services (e.g. VPN, firewalls, directory services, etc).

Secondly, the operational and managing side of the APS model is situated at the next layer, containing the providers of the *infrastructure*, required to coordinate the network and to manage the systems (hardware and software), supply, operations and commercial aspects of the application delivery (e.g. billing, accounts management, customer support).

Next stratum contains the vital ingredient of the ASP model, being the actual *application* service, specifically developed for the purpose or a ready-made packaged application, adapted for ASP delivery.

Finally, the true ASPs are situated at the top of the chain. They create a complete service *solution* by packaging the software and infrastructure ingredients with business and professional services.

Dependent on the goal, available resources and developed capabilities, some application providers opt for a vertically integrated model, owning and controlling every layer themselves, while others focus only on the final delivery and outsource the non-core activities. The choice of the appropriate level of integration depends on the trade off between the desired level of control, which is higher for the former model, and greater economies of scale, characterizing the latter alternative. (Tao, 2001)

c) Software plus Services

Few years ago a new concept, called “Software plus Services”, was introduced into the software world by Microsoft Corporation. With its “Software plus Services”-principle, Microsoft tries to combine the flexibility of the hosted services with the power of client- and server software (Microsoft Cloud Strategy, 2010). In contrast to “Software as a Service” concept, which focuses on the software solutions delivered over the internet, “Software plus Services” address the internet services, combined with software, installed at the customer’s location. As stated by Tim O’Brien, a Director Platform Strategy responsible for the development and the stating of the platform strategy at Microsoft: “*You have to consider the ‘Software plus Services’ as a hybrid approach, where the best of the software world is combined with the best of the service world*” (Gandasoebrata, 2008, p.54).

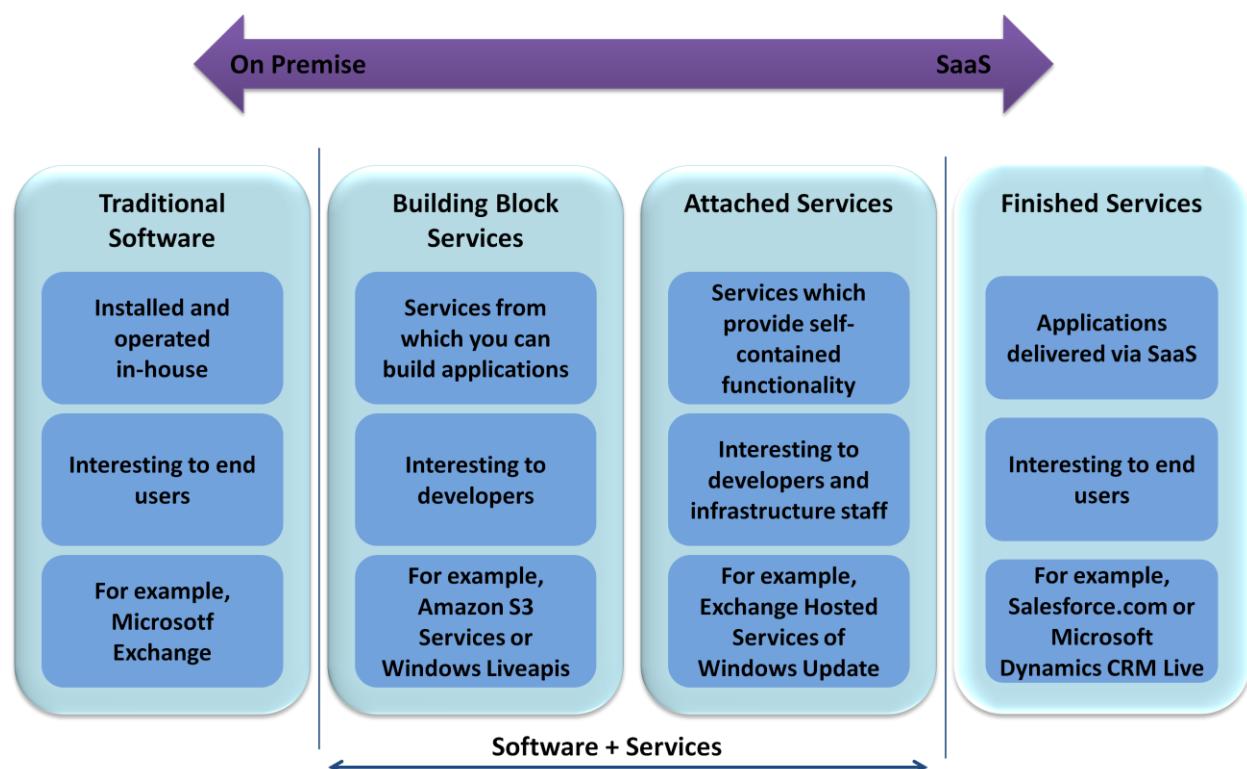


FIGURE 31: SOFTWARE DELIVERY CONTINUUM (Sangwell, 2007)

The hybrid nature of “Software plus Services” principle is clearly represented on FIGURE 31, where Kevin Sangwell³⁰ (2007) makes a distinction between:

³⁰ Kevin Sangwell is an infrastructure architect in the Microsoft Developer and Platform Group. He has held a number of technical and leadership roles in the IT industry for more than 16 years, including five years as a principal consultant in Microsoft Consulting Services.

- *Traditional software*, which refers to the applications installed on premises of the customer, such that only internal users have an access to the applications.
- *Building block services* which are put in the cloud and provide low-level capabilities that can be consumed by developers when building a composite application.
- *Attached services* that provide a higher level of functionality compared with building block services. Applications leverage attached services to add functionality.
- *Finished services* which are analogous to full-blown applications, delivered over the Internet using the SaaS model.

The new approach seems to be suitable when considering such advantages of on-premise software, as security, adaptability and control issues.

d) Conclusion

Although it may seem that there exist many software delivery alternatives, the greatest threat comes especially from the traditional on-premises software and this due to several reasons. Firstly, the potential customers are already familiar with the traditional software delivery model and most of the companies take a suspicious position against the on-demand solutions, especially when considering the security and data ownership issues. Secondly, the ASP model, which became popular in the late ‘90s, has almost left the software market due to the multi-tenancy possibility offered by SaaS. Finally, seen the recent nature of the Software plus Services concept, the companies are either not aware of its existence or do not see any benefits compared to the on-premise software or SaaS.

TABLE 2 below provides the reader with the comparison of SaaS to the alternative software delivery models, discussed in this part of our master dissertation. The business models were assessed on the following criteria:

- The major **costs**, which accompany the implementation (investment in the required infrastructure) and the use of the application (up-front license cost and maintenance cost).
The “-” symbol indicates that the cost is eliminated from the business model.
- The channel, through which the application is **available** for use (private network, internet).
- The **control issues** and **data security** concern, where “+” sign refers to the full internal control and data ownership.

- **Customization capabilities** indicate whether the application can be customized, dependent on the customer needs, and adapted to the changing business processes of the company (with the “+” symbol in case of the possible customization).
- **Scalability** factor refers to the ability of the application to grow together with the organization, such that the increasing amount of data is processed appropriately without any negative effect on the processing time.

		On-premise	ASP	SaaS	Software+Services
COSTS	Infrastructure investment	+	-	-	+
	Up-front license cost	+	+	-	+
	Maintenance cost	+	-	-	+
Availability		Private network	Internet	Internet	SW*: Private network SR**: Internet
Control issues & data security		+	-	-	+
Customization capabilities		+	+	-	SW: + SR: -
Scalability		-	+	+	SW: - SR: +

*SW = Software; **SR = Services

TABLE 2: THE COMPARISON OF VARIOUS SOFTWARE DELIVERY BUSINESS MODELS

3.1.2. The bargaining power of suppliers

As stated previously (supra, p.32), the ISV has a choice between vertical integration and outsourcing of some or all architecture layers, dependent on the intended goals and available resources and capabilities. Consequently, more activities and/or layers to be outsourced, more suppliers or, more appropriately, enablers of the service there would be, what in turn results in higher dependence of the SaaS provider on the suppliers.

As the reader may already know, there are three major enablers active in the cloud, that substantially influence the quality and reliability of the SaaS provision. Firstly, there are **IaaS providers**, who offer the computing and networking resources. Seen the emerging nature of the cloud services in general and IaaS market in particular, the latter one is characterized by the intense price competition, obliging the IaaS vendors to differentiate on type of service (Conry-Murray, 2009). As a result, the SaaS provider benefits from the freedom of choice and dependent on the postulated objectives and functional, qualitative and quantitative requirements may either

go in partnership with famous IaaS rivals as Amazon.com, IBM, IT&T or less-known but at the same time less expensive IaaS providers like Rackspase, Savvis, Unisys and more (see APPENDIX 3.1: 12 IaaS providers).

Secondly, the ISVs can outsource the platform application layer to the **PaaS providers**, who offer the large-scale development platform for application developers. As in the case of the IaaS, the PaaS market is characterized by the growing trend as well. The recent survey, conducted by the WinterGreen Research, showed that in 2009 the PaaS market was dominated by such players as IBM, controlling the 73% of the market share, followed by Oracle/BEA/Sun with 6% and Microsoft with 5% market share respectively (Curtiss, 2010). The other 16% is divided between various smaller players like Bungee Labs, sevenP, WaveMaker and more.

Finally, if the ISV decides to limit the core activities to the final delivery and implementation, consequently becoming a **SaaS-integrator**, he must consider the partnership(s) with the **SaaS developers/vendors**. The services of SaaS-integrators are valued by the companies, which lack the necessary IT expertise, required to find and to implement the sophisticated SaaS solutions (Herbert, Ross, Karcher, 2010) as for example those offered by Salesforce.com. Consequently, the potential SaaS-integrators or already existing System Integrators (SIs), which consider the expansion into SaaS (e.g. Accenture, IBM, Deloitte, etc.), have to target the vendors of the more sophisticated SaaS solutions, like those offered by Salesforce.com, Amazon.com and Google Apps (see APPENDIX 3.2: SaaS-Integrators).

To conclude, we can say that in general the potential IaaS and/or PaaS providers do not possess much power and this due to the rapid growth of the cloud services industry, which is in addition, is characterized by the tough competition. In case of the SaaS-integrators, it may seem that the latter highly depend on the SaaS vendors/providers due to the relatively small market of the sophisticated SaaS solutions. Otherwise, SaaS-integrators can become very important partners, providing the extra delivery channel and in such a way increasing the customer base. Furthermore, it is beneficial for both suppliers and SaaS vendors to create the win-win situation in the form of the partnership, which would result in a trust relationship.

3.1.3. The bargaining power of customers

As already pointed out previously (supra, p.16), the SaaS business model implies fundamentally different vendor/customer relationship, putting the customer in a **more powerful position** compared to the traditional on-premise delivery model and this due to several reasons.

Firstly, the positive evolution of the SaaS market (infra, p. 54) attracts increasing number of SaaS providers in all segments, what results in growing competition and consequently, a **broader choice** for the customer.

Secondly, in order to attract and to retain the customers, the SaaS provider must meet all the customer's needs concerning the insurance of the continuous availability, reliability, security and scalability of the software solution. In addition, the customers expect that the SaaS vendors work out the reliable security policies and procedures, which protect the customers' often confidential corporate data. If the customer's expectations are not met, the SaaS provider risks to pay a penalty, which is pre-determined in a SLA or even, lose the customer either directly or after the expiration of the subscription period. Consequently, the customer can benefit from the relatively **low switching costs**, which are also positively influenced by the eliminated installation and maintenance costs due to the services nature of the on-demand solution.

Taking into account the increasing competition on the SaaS market and the criticality of meeting the customer's needs, the SaaS vendor may try to loosen the customer's powerful position by continuously improving the quality of the services and composing the SLA, which will be beneficial for both parties.

3.1.4. The intensity of competitive rivalry

Even though many IT gurus were, and some of them are still, sceptical about the success of SaaS, mostly due to the failure of initial ASP model in the end of '90s, the SaaS market continues to grow thanks to the boosting demand for SaaS solutions in the business environment. As expected by Gartner, the SaaS enterprise application market will amount \$16 billion in 2013 (Pettey & Stevens, 2009). Consequently, the promising SaaS market attracts increasing number of ISVs, causing greater competition and resulting "*[...] in a shake-out in the SaaS industry and consolidation of the players*" (Enabling SaaS, 2008). Furthermore, the competition on the SaaS market is enforced by the relatively low switching costs, loosening the power of the SaaS providers against their customers (supra, p. 53). Therefore, in order to attract and to retain the customers, the SaaS providers must **differentiate** themselves from the competitors and deliver their solutions in the most **cost-effective** way, ensuring at the same time the availability, reliability, security and scalability of the software solution. In addition, the potential entrants and young SaaS providers face the tough competition with the industry rivals, as Salesforce.com, Oracle and many others dependent on the targeted market segment (see TABLE 3).

SAAS MARKET SEGMENT	KEY PLAYERS
Content, Communications and Collaboration (CCC)	Cisco WebEx – SumTotal – IBM Lotus
Customer Relationship Management (CRM)	Salesforce.com – Oracle – RightNow
Enterprise Resource Planning (ERP)	SAP – NetSuite – Workday
Supply Chain Management (SCM)	Descartes – Ariba – Ketera
Office Suites	Google – Zoho
Digital Content Creation (DCC)	YouTube – Adobe

TABLE 3: REPRESENTATIVE PROVIDERS OF THE MAIN SAAS MARKET SEGMENTS
(Callewaert, Robinson, Blatman, 2009)

It is obvious that various segments in the SaaS industry are characterized by different revenue opportunities and saturation degree due to the difference in customers' adoption rate. According to Gartner's research (Ping & Da Rold, 2009), SaaS is most mature worldwide in applications in such areas as collaboration, CRM, e-mail, HR and procurement.

Furthermore, in an earlier report "Market Trends: Software as a Service, Worldwide, 2009-2013" Gartner published the revenue growth per SaaS segment over years 2008-2009 (Pettey & Stevens, 2009), summarized in TABLE 4 below.

As can be seen in the TABLE 4, the Office Suites and Digital Content Creation (DCC) are the fastest-growing SaaS markets, while Content, Communications and Collaboration (web-conferencing, e-learning, e-mail and team collaboration), Customer Relationship Management (sales, marketing and servicing) and Enterprise Resource Planning (mainly Human Capital Management and to a lesser extend Enterprise Asset Management, Manufacturing/ Operations and Financial Management Systems) span the biggest market shares.

	Revenue growth	2009		2008	
		\$ mio	% of total market	\$ mio	% of total market
Content, Communications and Collaboration (CCC)	16%	2,507	31%	2,155	33%
Customer Relationship Management (CRM)	18%	2,169	27%	1,838	28%
Enterprise Resource Planning (ERP)	10%	1,376	17%	1,256	19%
Supply Chain Management (SCM)	15%	861	11%	748	11%
Office Suites	276%	512	6%	136	2%
Digital Content Creation (DCC)	80%	126	2%	70	1%
Other Application Software	25%	483	6%	387	6%
Total Enterprise Software	22%	8,035	100%	6,591	100%

TABLE 4: WORLDWIDE SOFTWARE REVENUE FOR SAAS DELIVERY WITHIN THE ENTERPRISE APPLICATION SOFTWARE (Pettey & Stevens, 2009b)

3.1.5. The threat of new entrants

The rapid growth of the Software as a Service market as a result of the increasing surge in customer adoption of SaaS solutions among enterprises in various industries (e.g. adoption rate of 63% in 2008 compared to 32% in 2007 (Kaplan, 2008a)) and the success of such SaaS providers like Salesforce.com, Google, Oracle and NetSuite, make the SaaS industry very attractive to the potential SaaS players.

The new entrants to the SaaS market can arise from two sources. Firstly, there are *existing ISVs*, who intend to add the SaaS offering to their product portfolios, initially containing the traditional on-premise software. Those ISVs have to overcome various **operational** and **organizational challenges** (Kaplan, 2008b) in order to accomplish this task, which may seem to be easy theoretically, but very sophisticated and expensive in practice. Particularly, on the operational side, the SaaS involves completely different development, delivery, packaging and pricing approaches and in addition requires entirely new sales, support and revenue recognition processes. Moreover, there exists a risk of cannibalizing the existing customer base due to the internal competition and channel conflicts. (Kaplan, 2008b)

Next to the operational challenges, the switch to or extension with the SaaS option often requires the radical change in the organizational culture. This mainly caused by the shift from product-centric to service-driven principle. As stated by Jeffrey M. Kaplan (2008b, p.2): “*Rather than simply react to customer problems, as they’ve done in the past, software vendors are now responsible for proactively managing their SaaS solutions to ensure their uptime and availability.*”.

Secondly, the rapidly evolving SaaS market can be challenged by the *new startups*, opting to compete with incumbents as Saleforce.com or targeting some profitable niches. The major obstacle to succeed as a startup comes from the considerable initial investment, required to set up the infrastructure and/or to find the appropriate partners (e.g. for IaaS, PaaS, etc). Furthermore, the potential SaaS vendor must possess enough funds to survive the long cash burn period before the breakeven is achieved (supra, p. 43).

As a conclusion, it is obvious that the SaaS market is characterized by relatively high entry barriers due to the operational and organizational challenges, faced by the existing ISVs and the considerable funds, required by the new startups.

3.2. Advantages and disadvantages of SaaS business model

Since the introduction of internet and the emergence of e-commerce, IT has become an integral part of all businesses. That is why it is crucial for all companies to make a right decision regarding the purchase and implementation of the required software applications. If taking such a decision seemed to be rather simple a decade ago, when only on-premise software was available, nowadays the management has a choice between various alternatives, described in previous part (supra, p.45). As a consequence, in this part of our dissertation we are trying to analyse possible advantages and disadvantages of the SaaS delivery model.

During the last decade a lot have been written, especially in the business environment, on SaaS advantages or disadvantages. Each white paper or industry research, sponsored by industry leaders, was still coloured in favour or disfavour of SaaS adoption, in function of author's position in SaaS ecosystem (customer or vendor) and/or role in the software industry (novel emerging SaaS provider or dominant (on-premise) player (e.g. SAP, Microsoft)).

In our dissertation we opted for an unbiased view on SaaS benefits and risks, and followed the same approach described in the paper published by *Helsinki School of Economics* (Sääksjärvi, Lassila, Bordström, 2005). This approach allows not only objectively represent various positive or negative aspects of SaaS business model, but also (taking the time lag of 5 years into account) compare whether additional elements emerged or disappeared as SaaS adoption popularized.

The methodology is as followed:

- The selected articles must be recently (between January 2007 and September 2009) written.
- The two perspectives on the SaaS vendor and SaaS customer must be simultaneously present.
- The majority of viewpoints on SaaS business model and ecosystem must be equally represented:
 - **Academic research** (The Paul Merage School of Business, University of California)
 - **Information technology research** (Gartner Inc and Kelton Research)
 - **White papers** from industry participants (IDS Scheer and Synverse)

As each paper described common terms by different expressions and on the opposite, caused confusion on similar requisites, due to merger of various elements; the challenge was to identify universal elements applicable in the industry, at the same time without ignoring distinguishing elements. We also summarized our findings in four tables (see TABLE 5, TABLE 6, TABLE 7, TABLE 8), representing value and risk issues for customers and vendors respectively.

Reviewing the results from the conducted analysis, major benefit for the SaaS customer comes under the **lower Total Cost of Ownership**. In our discussion we split up TCO in two different cost drivers, with the consequence that SaaS offering **eliminates the initial investment costs** (sometimes referred as sunk cost, because time renders technology obsolete) and **lowers support and maintenance costs** as all the responsibility comes to lie on the shoulders of the SaaS provider. Other cost aspect is related to the payment model, under which customer can **easily up- or down scale** the latitude of the application and is charged for the “**consumed” services** (pay-per-use, subscription based, etc.).

Next group of advantages is associated with shorter time-to-market as the causal element. The majority of the articles identify **continuous upgrades** possibilities, **without conflicts** with the previous versions as direct benefits.

At the same time SaaS customer has the opportunity to **focus on core capabilities** (as the supporting activities are outsourced to the SaaS provider) and concurrently enable **better capital allocation**.

Less frequently mentioned, and therefore new, benefits are the **increasing bargaining power** of SaaS customers and subsequent freedom to change or to switch, though the latter position is highly dubious.

However, risks associated with SaaS-based delivery may not be underestimated. The **security issues** accompanied with data **privacy** and data **reliability** outside the firm’s firewall continue to dominate the statistics on SaaS disadvantages. Even after ten years of experience, growing adoption trend and reassurances by the major players (e.g. IBM, Kelton research), customers still distrust this aspect of remote data management and -storage. **Limited customization possibilities** form next disadvantage, whereby the lack of customization forms hindrance for the successful and complete **integration** of the SaaS application within in-house activities.

Novel risk, which was not determined in the previous analysis, is the additional **vendor’s management cost** that increases as the number of SaaS vendors augment.

The growing emergence of new companies that provide SaaS based services can be explained by the advantages that SaaS business model promises. The major elements are the (expected)

revenue growth and **cost aspect**. Primarily, the multi-tenant architecture allows forcing down the software **development, test** and **maintenance costs**. Thanks to **economies of scale**, SaaS vendor has more resources to invest in future development, ensuring in this way more **frequent upgrade, faster time-to-market, shorter sales cycle** and consequently **earlier revenue recognition**.

Surprisingly, what does not appear from our analysis is the advantage associated with “long-tail” effect, which was originally considered as the driving revenue force behind SaaS growth. However, this effect may be disguised in the “**global market**” **access** benefit, where SaaS vendor can offer the SaaS application independent of the vendor’s location, but also independent of the customer’s size.

Nevertheless, for the same token the mentioned benefits can quickly turn into risks. Ponderous risk is the **huge initial investment** and at the same **time low and slow revenue generations**, what leads to the **cash flow problems** in the first years. As the delivery responsibility is completely transferred to the SaaS vendor, **additional operational costs** (hosting, disaster recovery, system management, etc) comes into play.

What is different from previous analysis is that analyzed resources do not claim that revenue streams become predictable. Very recently quite the reverse appeared where the revenue predictability element was completely vanished because of the high churn rate and **lack of customer lock-in**.

Conclusion made from the performed analysis is that benefits and risks for vendor and customer are **mutually interrelated**. The major amendment, compared to the on-premise setting, is the transfer of the responsibility for development, delivery, support and maintenance of the software, from customer/user to the provider.

Description of the benefits for the SaaS customer	The Paul Merage School of Business, University of California, Irvine	Gartner Inc.	Acumen Solutions®, Inc.	SYNVERSE	IDS Scheer	
	Software as a Service: Implications for Investment in Software Development	Learn the economic advantage of pure SaaS provider	Acumen Solutions research report: On demand is In demand: SaaS Adoption accelerates among large enterprises	Enabling enterprise to SaaS: from conceptualization to implementation	A cloud computing eBook: SaaS on the rise, but does it deliver	Occurrence of the benefit
	29/01/2007	26/11/2007	4/05/2008	28/07/2009	18/09/2009	
SaaS initial investment is relatively lower compared to on-premise software	x	x	x	x	x	5
SaaS allows eliminating sunk costs (license, infrastructure, etc.)	x	x	x	x	x	5
SaaS application has significantly shorter time to deployment/ramp up	x		x	x	x	4
SaaS applications are relatively fast to adapt	x		x	x	x	4
SaaS allows more frequent updates without large disruptions	x		x	x	x	4
SaaS payments principle allows customers to pay only for consumed services		x	x			2
SaaS allows customers to allocate foreseen IT capital to enterprise critical functions			x		x	2
SaaS allows customers to focus on firm's core capabilities			x		x	2
SaaS enables to access the application independent of the user's location (web based access)	x			x		2
SaaS customer manages the scalability of the application usage				x		1
SaaS customer enjoys the predictability of the IT costs	x					1
SaaS customer enjoys increased bargaining power	x					1
SaaS customer has the freedom to switch across the providers	x					1

TABLE 5: LIST OF BENEFITS FOR THE SAAS CUUSTOMER ACCORDING TO VARIOUS RESEARCHES

Description of the benefits for the SaaS vendor	The Paul Merage School of Business, University of California, Irvine	Gartner Inc.	Acumen Solutions®, Inc.	SYNVERSE	IDS Scheer	Occurrence of the benefit
	Software as a Service: Implications for Investment in Software Development	Learn the economic advantage of pure SaaS provider	Acumen Solutions research report: On demand is In demand: SaaS Adoption accelerates among large enterprises	Enabling enterprise to SaaS: from conceptualization to implementation	A cloud computing eBook: SaaS on the rise, but does it deliver	
	29/01/2007	26/11/2007	4/05/2008	28/07/2009	18/09/2009	
SaaS business model enables vendor to reduce the software development, test and maintenance costs	x	x		x	x	4
SaaS vendor enjoys the economies of scale due to multitenant character of the delivery model		x	x	x	x	4
SaaS vendor keeps up with the completion and market pace because of faster release cycles		x		x	x	3
SaaS business model enables to achieve " higher average " software quality	x			x		2
SaaS vendor enjoys faster revenues due to shorter time-to-market		x		x		2
SaaS vendor does not cause any competition between present and future versions of the software (no cannibalization of the existing software)	x					1
SaaS vendor provides consistent maintenance and upgrades for all customers (uniformity in service delivery)			x			1
SaaS vendor has access to a global market				x		1
SaaS vendor better understands the end customers' needs				x		1

TABLE 6: LIST OF BENEFITS FOR THE SAAS VENDOR ACCORDING TO VARIOUS RESEARCHES

Description of the risks for the SaaS customer	The Paul Merage School of Business, University of California, Irvine	Gartner Inc.	Acumen Solutions®, Inc.	SYNVERSE	IDS Scheer	Occurrence of the risk
	Software as a Service: Implications for Investment in Software Development	Learn the economic advantage of pure SaaS provider	Acumen Solutions research report: On demand is In demand: SaaS Adoption accelerates among large enterprises	Enabling enterprise to SaaS: from conceptualization to implementation	A cloud computing eBook: SaaS on the rise, but does it deliver	
	29/01/2007	26/11/2007	4/05/2008	28/07/2009	18/09/2009	
SaaS customers have security concerns including authentication, backup and recovery, high-availability and employment of standards	x		x	x	x	4
SaaS customers have concerns on the data reliability outside the firm's firewall	x		x		x	3
SaaS customers have concerns on the data privacy outside the firm's firewall	x		x		x	3
SaaS customer question the integration issue between SaaS application and in-house applications			x	x	x	3
SaaS applications suffer from limited customization possibilities		x			x	2
SaaS customer have additional vendor management costs as SaaS vendors tend to offer smaller functional footprints and companies have to deal with multiple SaaS vendors					x	1

TABLE 7: LIST OF RISKS FOR THE SAAS CUSTOMER ACCORDING TO VARIOUS RESEARCHES

Description of the risks for the SaaS vendor	The Paul Merage School of Business, University of California, Irvine	Gartner Inc.	Acumen Solutions®, Inc.	SYNVERSE	IDS Scheer	Occurrence of the risk
	Software as a Service: Implications for Investment in Software Development	Learn the economic advantage of pure SaaS provider	Acumen Solutions research report: On demand is In demand: SaaS Adoption accelerates among large enterprises	Enabling enterprise to SaaS: from conceptualization to implementation	A cloud computing eBook: SaaS on the rise, but does it deliver	
	29/01/2007	26/11/2007	4/05/2008	28/07/2009	18/09/2009	
SaaS vendor experience negative impact on the cash flow statement with smaller payments rather than large periodic payments	x	x		x	x	4
Requires higher (initial) investment in order to deliver service (infrastructure, servers, etc)	x	x			x	3
SaaS vendor experience lack of customer lock-in		x	x			2
SaaS vendor does not enjoy the predictable revenue stream due to high churn and high competition		x				1
Require additional operational costs of hosting, disaster recovery, system management, etc		x				1

TABLE 8: LIST OF RISKS FOR THE SAAS VENDOR ACCORDING TO VARIOUS RESEARCHES

4. The implementation of SaaS business model

4.1. How to make it a success story?

Finalizing our thesis, we would like to provide a list of best practices to current or future SaaS vendors. We do not pretend that this checklist is exhaustive and can be considered as a panacea for the regardless which SaaS solution providers. But still, we believe that the criteria mentioned in this part may play an important decisive role. We extracted the best practices from Bessemer Venture Partners and Saugatuck Technology reports.

1. Use the appropriate metrics

During the progress of our discussion, we already have emphasized the importance of the correct usage of SaaS related metrics. In this section we would like to discuss only the utility and employability of the most important metrics. Bessemer Venture Partners in the recently released report, identified 6C's of Cloud Finance that must be present on the dashboard of each SaaS CEO. (Botteri et al., 2010)

- **CMRR – Committed Monthly Recurring Revenue**

Annual Contract Value negatively corrected for the churn, or customers that the firm expects to loose; and positively adjusted for the potential of the future customers (new customers + up sell). CMRR values are used in **operational planning and financing, valuation of the company and sales force assessment**.

- **Cash flow**

Taking into account that a SaaS based company needs 50 to 70 % more capital to achieve **cash break-even** than the on-premise counterpart, it is thoughtful to have CEO's hand on the cash flow pulse. Key drivers of cash consumption are: Customer Acquisition Cost, churn and renewal rate (Byron & Botteri, 2010). Bessemer even advises to initiate various incentives (e.g. discount, concessions, etc.) in order to motivate firm's customers to pay in advance.

- **CMRR pipeline**

In order to survey the **future perspectives** SaaS firms must also have a clear view in CPipe values.

- **Churn rate**

Churn has many causes from dissatisfaction with the current service (downtime, UI or workflow complexity, etc.) as the most evident one to customer's bankruptcy or merger. However, retaining the firm's customer base is the key challenge for subscription based services.

- **CAC ratio – Customer Acquisition Cost Ratio**

The CAC ratio is indispensable in order to follow up the **sales and marketing investments** (When should one expand the sales force?) and expenses (Are the marketing costs justifiable, taking into account the CMRR growth?).

- **CLTV – Customer Life Time Value**

Customer Life Time Value indicates whether the chosen **business model is profitable or not**.

Summarizing the above discussion in the TABLE 9 below, Bessemer represents the measurements and the targets for each metric.

Metric	Measurement	Target
CMRR	<ul style="list-style-type: none"> ○ Growth rate ○ Up sell versus new customers 	<ul style="list-style-type: none"> ○ Should be more than 50% ○ Up sell \geq churn
Cash flow	<ul style="list-style-type: none"> ○ Free Cash Flow ○ Payment terms ○ Professional service GM 	<ul style="list-style-type: none"> ○ Breakeven at 50 % growth rate ○ 1-year upfront mix $> 50\%$ ○ > 0 on the project basis
Churn	<ul style="list-style-type: none"> ○ Churn rate 	<ul style="list-style-type: none"> ○ Churn $< 12\%$
CAC ratio	<ul style="list-style-type: none"> ○ CAC ratio ○ CMRR renewal cost 	<ul style="list-style-type: none"> ○ CAC > 1 ○ $< 30\%$ of annualized GM
CLTV	<ul style="list-style-type: none"> ○ CLTV ○ G&A as % sales ○ R&D as % sales 	<ul style="list-style-type: none"> ○ CLTV > 0 ○ G&A $\approx 15\%$ at scale ○ R&D $\approx 10\%$ at scale
CPipe	<ul style="list-style-type: none"> ○ CMRR 	<ul style="list-style-type: none"> ○ 3 to 5 times CMRR target for the quarter

TABLE 9: SaaS RELATED METRICS

2. Transparency in pricing strategy

The new delivery model implies novel ways in charging the customer. Concurrently, the major SaaS advantage lies on the cost side of the offering. In order to underline the cost advantage of the firm's offering and persuade the customer, SaaS vendor must establish a **clear price setting**. Customer should have a clear understanding that pricing is not only monthly/usage subscription, but in some cases, may require additional fees for storage service or further support levels.

3. Service Level Agreements (SLA)

Mistakenly, SLA is contemplated as a guarantee for 100% service delivery. However, it is rather a communication mean, which establishes expectations that customers may have about service delivery, while taking into account what is possible in terms of support and technology. Either SLA provides an expedient when particular agreements are not met.

In order to set clear expectations SLA should include and explicitly specify following elements, based on the recommendations provided by Software and Information Industry Association (SIIA) (SaaS SLA Requirements, 2010):

- *Service hours* should take into account the customer's meridian circle, and what is more important, the SaaS vendor's help desk should have clear guidelines about different trouble shooting scenarios and (authorized) actions to execute (Wainewright, 2010).
- *Availability* may be represented as an up-time percentage (e.g. 99,9%, 99,99%, etc), or as percentage of downtime (0,1%, 0,01%, etc.). However, in promising certain service levels SaaS vendor should mention whether window required for (non- / urgency) maintenance activities is taken into the calculation or not (Falcon, 2009).
- *Reliability* concerns data safety, data reliability and customer protection and is expressed in the number of outages, congestions while accessing hosted services and the time required to restore the affirmed level of service. (Fear of SaaS Reliability, 2008)
- *Support* is indispensable, even if the SaaS vendor thinks that SaaS offering is fool-proof. Support should include all the arrangements in order to get the necessary assistance not only in technical nuances, customization or integration (Kaplan J., 2008c), but also in optimization, or in gaining the maximum value and productivity (Blaisdell, 2010) out of a SaaS application.

- *Performance standards* should be stipulated beforehand, including SLA measurements as transaction-, Business Process-, system Availability Performance, accessibility, scalability and response and repair time commitments.
- *Penalties* for non-compliance with the agreements.

4. Publish Health Dashboard (Rachitsky, 2008)

With the view to reinforce the SLA, SaaS provider also should make public a **history³¹ of the uptime and outages**; and present the service and platform partners, such that the effectiveness of service delivery could be demonstrated, especially if customers require high availability and connectivity of the offering.

Another important element is the **history of the response time**. This data reassures the customer that in case of emergency help or support will be rapidly provided.

At the same time, public health dashboard should also provide data on every **current service** that a SaaS provider offers. Status descriptions have to be **timely, accurate and easy to find**.

5. Minimize operational risk perception with SAS70 Type II audits/Safe Harbor (Directive 95/46/EC) and Payment Card Industry (PCI) compliance

With recent adoption of the **Sarbanes-Oxley Act of 2002** on controls over the financial reporting and reliability of an entity's system (Statements on Auditing Standards, 2010), SaaS vendors may use **SAS70 (Type II)** and **Trust Services** (SysTrust and WebTrust) as very powerful **marketing** tools.

The former standard provides control on financial matters of the SaaS provider and “[...] *an in-depth audit of control objectives and control activities, which often include controls over information technology and related processes*” (About SAS 70, 2009). The latter group of standards, “[...] *provides assurance that an organization's system's controls meet one or more of the Trust Services principles and related criteria. Areas addressed by the Principles include: security, online privacy, availability, confidentiality and processing integrity issues*” (Building Trust and Reliability, 2007, p.11).

³¹ For instance: Amazon Web services URL: <<http://status.aws.amazon.com/>> or Blue Tie URL: <<http://support.bluetie.com/?q=node/819>> or salesForce.com URL : <<http://trust.salesforce.com/trust/status/>> or collection of various health dashboards URL: <<http://delicious.com/lennysan/healthdashboard>> (09.04.2010)

Important to make a distinction between **SysTrust** which is alluded to **hosted** applications in general (“[...] from personal computer- based payroll application with only one user to a multi-application, multi-computer banking system that has virtually unlimited users within and outside the organization” (Building Trust and Reliability, 2007, p.7)), while **WebTrust** focuses on **e-commerce** applications, where system robustness, security, online privacy, availability, confidentiality and processing integrity are of significant importance. (Building Trust and Reliability, 2007)

For the US SaaS vendors operating in European Union, comparable legislation prospects prevail, but under the **Safe Harbour Principles**. The principles are established in accordance with **EU Directive 95/46/EC** on data protection (Safe Harbour Principles, 2010).

SaaS vendors that provide healthcare application or that manage data electronic health care transactions should take the Health Insurance Portability and Accountability Act (HIPAA) into account. HIPAA’s **Security Rule** requires **administrative** (includes legislative compliance with the HIPAA act), **physical** (“[...] controls physical access to protect against inappropriate access to protected data”) and **technical** (“[...] protects communications, containing PHI³², transmitted electronically over open networks from being intercepted by anyone other than the intended recipient”) **safeguards** (Health Insurance Portability and Accountability Act, 2010).

SaaS vendors dealing with customers paying online, or which hold, process or exchange cardholder information should comply with Payment Card Industry (**PCI**) **Data Security Standards**. Standards are established to prevent credit card fraud. (About the PCI DSS, 2010) Some may assert that “[...] secure data state may be more expensive than managing the risk of confidentiality breaches” (PCI DSS, 2010), however studies have shown that this cost is justifiable (PCI Compliance Cost Analysis, 2010).

6. Explore the advantages of the ecosystem

The advantage of the SaaS ecosystem is twofold. Firstly, next to the internet as a direct sales channel, ecosystem enables supplementary selling through referrals by the clients/users, selling on the SaaS vendor’s behalf, virtual/actual conferences, joint press releases or mailings with partners. Secondly, the ecosystem provides an opportunity for a young start-up to enter the SaaS business through strategic collaboration or leveraging partnerships. Making innovative

³² PHI stands for Protected Health Information

combinations of existing applications, delivering this way competitive advantage to the user, is the key to success.

4.2. What can go wrong?

One can distinguish two different origins of failures that in the end have similar causes, but different ways that lead to them. It is important to make clear difference between, on the one hand products and services that are developed, especially, to be used in the SaaS context, and on the other hand those that must make a transition from the on-premise rationale to SaaS/on-demand.

In the first case one faces obstacles as wrong choice of the underlying business model, inability to deliver promised services on time or within agreed SLA, or inefficiency in creating the needed trust relationship.

In the latter case, the transition from the one on-premise business model to on-demand of the same or partly adjusted for SaaS product can drive management to make tradeoff between existing infrastructural elements and outsource capabilities, workarounds and integration/collaboration elements. The improperly made tradeoff will lead to fiasco of the planned transition and consequently to the termination of a potential new business idea. Next to the required trade-off, organization must be ready and willing to adopt SaaS rationale, in this way adjusting “[...] *adjusting their [company's] core competencies, training methods and processes*” (Ramanujam, 2007, p. 2).

In what follows, we concentrate ourselves on the underlying causes, making abstraction of the origin, whether it is a new business initiative or a transformation of the existing one.

1. Industry's acceptance

The overall success of a company, active in the SaaS-sector, is highly determined by the “[...] *industry's willingness to accept the security and logistics of an off-premise SaaS-based model*” (Chandler, 2007, p.2).

Success rate of the brightest companies, as *CrystalReports.com*, *PivotLink*, *Oco*, *LucidEra*, *Dimensional Insight*, *Salesforce.com* and *OnDemandIQ* cannot outperform high failure rate, that can be explained, following the Gartner's rationale, by the fact that SaaS-providers are still in the embryonic phase (Bitterer et al., 2008) which is characterized by high uncertainty (of the

business drivers) and threaded by “*curse of innovation*” (Gourville, 2005).

The issue with the curse of innovation is that industry may be still satisfied with the current solution, and consequently will be reluctant to change, even if the new solution is superior in terms of technology or service delivery. To succeed in the emerging market, service vendors will have to make the transition as painless as possible for the users, or even consider offering services for free (however see associated risks in the later chapter on following freemium strategy).

The majority of CIO’s, even those who support the concept of the online delivery, may be very concerned about the security and reliability of the new approach and may hesitate to change, if the current system is not broken. Therefore, it is very important to demonstrate (superior) value of the concept to the IT professional based on business applications (e.g. CRM, human resources,...), such that they “[...] *will be more willing to adapt this mode of applications delivery within the IT realm*” (Dubey & Wagle, 2007, p.11) (e.g. e-mail, storage,...).

2. Breakdown of trust

A lot of SaaS failures can be attributed to a basic sociological-human factor as trust. From the moment customers start to disbelief in company’s trustworthiness, in function of service delivery and certitude, one may close the books, because customers will abandon the ship, which will consequently sink. Causes for breakdown of trust are numerous (Krigsman, 2008). Most evident one is the breakdown of delivery or simply translated, technological collapses, which are discussed in more detail later in this section (infra p. 71). However, there is more. From the research, performed by SaaS-pioneer Salesforce.com, combined with the study on “*Trust in IT outsourcing*” by the State University of New York at Buffalo, following conclusions can be drawn.

In the phase before adoption of a SaaS-based solution, “[...] *the lack of reputable vendors was found to dissuade adoption of new technologies*” (Randeree, Kishore, Rao, 2009, p.6). Customers must have certitude that “[...] *in turbulent times, the vendors that they contract can guarantee that they will not disappear or renege on the service level agreements*” (Randeree, Kishore, Rao, 2009, p. 5). Therefore, the lack of solid reputation or capability of the vendor undermines the basic trust, prohibiting this way further business development. The lacks of trust in post adoption relationship due to misunderstanding between customer and service provider, information asymmetries and rigid governance mechanisms, as consequence “[...]

poison the partnership and lead to termination" (Randeree, Kishore, Rao, 2009, p. 7).

Not only the trust between service provider and customer determines the viability of the company, yet there are also connections with partners in the ecosystem around. Early pioneers of SaaS era wrongly assumed that the on-demand business model was compatible with old-fashioned system integrators (SI) or traditional independent software vendors (ISV). These, however, are less appropriate partners to compete in innovative ecosystem. It has been shown that the majority of today's SaaS-based companies are successful, thanks to synergies from partnerships with "*[...] the emerging SaaS incumbents (Salesforce.com, Webex, etc...) and the new generation of smaller, more nimble and SaaS-savvy SI firms*" (Byron, 2008, p.2)

Providing as an example the SaaS mash-ups that are growing at an exponential rate and deliver solutions, which were not imaginable in the past in terms of speed, cost and usability (Wainewright, 2008).

Albeit, the success or failure of a partnership within SaaS environment is again in function of the "*[...] alignment between parties on key objectives and metrics*" (Wang & Adrian, 2007, p. 1). Forrester's research discloses three major forces that drive to misalignment (Wang & Adrian, 2007). Comparable to what has been mentioned in the customer-vendor context (vertical integration), can be partly applied for relationships between partners (horizontal integration) ((Randeree, Kishore, Rao, 2009)). If partners are not able:

- to define, and consequently to agree on, shared market goals
- to communicate to each other the preferred Go-To-Market (GTM) strategies
- to align the whole organization with a partnering commitment

then it is reasonable to expect that coordination-, monitoring-, negotiating- and governance costs, will deteriorate the earnings, and stimulate the opportunistic behavior.

3. Breakdown of delivery (Krigsman, 2008)

One of the critical requisite that is own to SaaS, but which is sometimes underestimated, is "*[...] the system architecture that is capable of supporting peak usage demands and the ability to process large numbers of transactions in a secure and reliable environment*" (Migliucci, 2006, p.2). For that purpose, in order to minimize downtime and poor performance, companies should invest in reliable and scalable architecture, guaranteeing necessary network bandwidth, security

certifications, backup tools and monitoring systems (The 7 Secrets of SaaS Startup Success, 2008) (supra, p. 24).

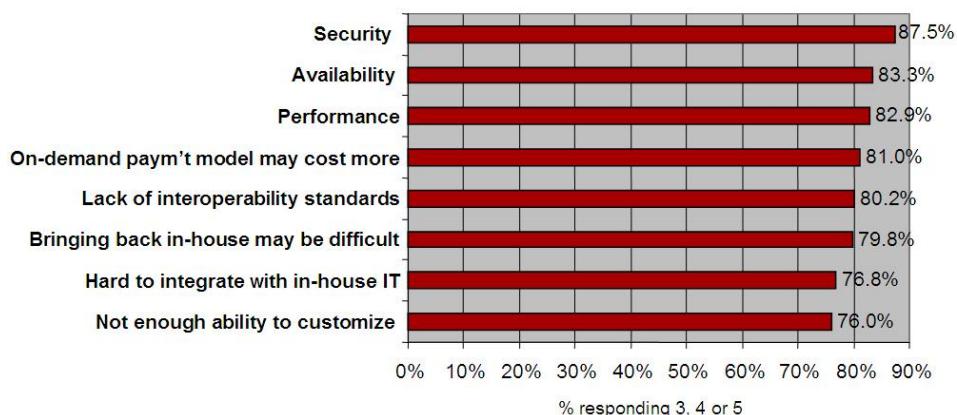
Surprisingly, we discovered a mismatch between customer expectations (on service level) and the actual potential of service delivery.

On the one hand, as appears from the IDC's "IT Cloud Services Survey: Top Benefits and Challenges", top three IT cloud services challenges, which SaaS users face (see FIGURE 32), and somehow claim, are: **security, availability** and **performance** (Gens, 2009).

However, when it comes to "secure and reliable environment", next state of affairs emerged from the SMB "Disaster Preparedness Survey", carried out by Symantec in 2009. Survey uncovers a "[...] large discrepancy between how SMBs [service providers] perceive their disaster readiness (see FIGURE 32) and their actual level of preparedness (see FIGURE 33). Furthermore, Symantec discovered that there are large, tangible costs to this lack of preparedness. SMBs can – and often do – lose business as a direct result of being unprepared for disasters" (SMB Disaster Preparedness, 2009, p.3), which are neglected because of low frequency/ high impact nature of events.

Q: Rate the challenges/issues of the 'cloud'/on-demand model

(Scale: 1 = Not at all concerned 5 = Very concerned)



Source: IDC Enterprise Panel, 3Q09, n = 263

FIGURE 32: CUSTOMER PRIORITIES IN DEALING WITH SaaS BASED SERVICES (Gens, 2009)

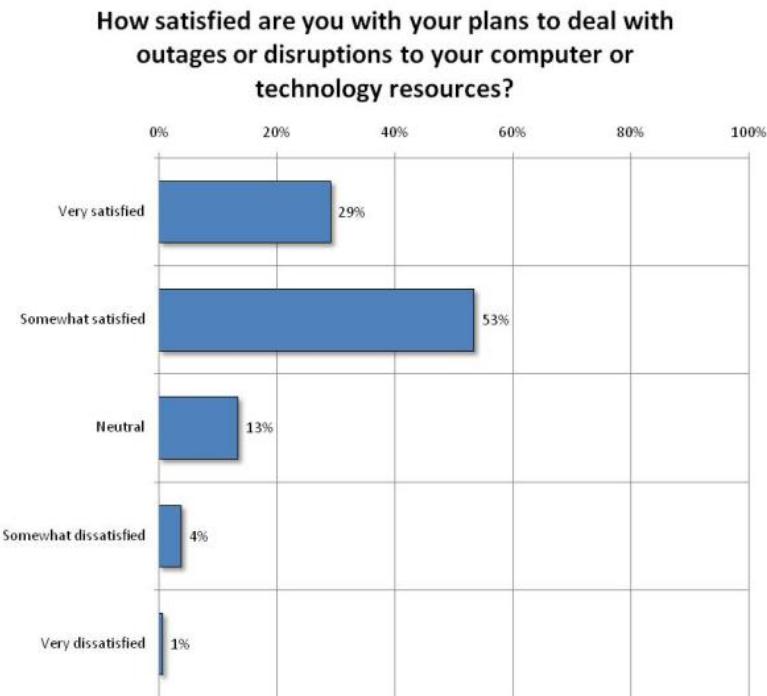


FIGURE 33: CUSTOMER'S SATISFACTION ON RECOVERY PLANS IN CASE OF DISRUPTIONS OR OUTAGES (SMB Disaster Preparedness, 2009)

4. Following freemium strategy

Among a mixture of, previously stated, reasons, explaining why SaaS may fail, one of the fundamentals that may lead to failure, is the non-workable business model behind SaaS architecture on its own. As discussed above, SaaS enjoys various possible ways to create business value for all stakeholders, but in this section we will focus on one particular and famous, among start-ups strategy, namely the freemium strategy and identify conditions under which one may make of it a million-dollar-business and under which one will never be able to take off.

Citing Murphy we can clearly see the core disadvantage of freemium strategy and one of the major reasons why following this course often leads to disastrous results is that: “*Business-focused people understand that free is not sustainable and they will wonder how long the vendor will be around if they do not charge for their product.*” (Murphy, 2010)

It is simple to understand that having thousands of users, which use services for free, does not lead to thousand or even hundred of (potential) customers, in contrary. In addition a well accepted assumption that current users may become future customers, through upgrading or up-selling, does not always work in the reality.

However, the aforementioned does not apply for every entity in the ecosystem. Well known examples are Google Apps or Adobe, which use freemium strategy to push SaaS adoption accompanied with elaboration of installed base and diffusion of related products. These gigantic companies are able to establish and reinforce their market power, but this revenue generation is possible not solely thanks to the freemium strategy. On the contrary, freemium strategy is used to attract the market attention, through free (partial) offering, creating in this way at the same time the entrance barriers for potential newcomers, and differentiating their product offering and the channels to reach customers.

This all lead to the following conclusion: freemium strategy may lead to potential failure under following conditions. First factor is the **firm size**: small companies, which do not have any market power and which are obliged to offer products or services for free, in order to be able to compete on the established market, because current free offer is used as an entry barrier by greater companies, are less likable to survive in already dominated market, even if the proposed solution is superior. Secondly, having only one product, which already has to be offered for free, does not leave any room for revenue generation for small companies. The more one can differentiate in **product types**, the more chances to survive one will have.

5. High overhead costs

Looking at the failure problem from internal, organizational point of view, many companies do not survive because of too heavy SG&A expenses, which cannot be supported with the generated revenues (Krishna et al., 2007). As deducted from Bessemer Venture Partners research on “*success factors of SaaS business model*”, mistake that is often made is the following: “[...] *companies staff up their sales efforts too quickly and make them too large before the sales model has been refined.*” (Byron, 2008). Explanation behind this statement can be found, if one considers Sales Learning Curve (SLC) (Leslie & Holloway, 2006). Concisely summarizing the SLC phenomenon we can state that the introduction of new product requires time to learn how to approach customers and sell product/services in the most efficient and effective way. The more a company learns about the sales process, the more efficient it becomes at selling, and the higher the sales yield. A longer learning curve in the introduction of a new product is associated with a greater revenue gap. (Leslie & Holloway, 2006).

Hiring decisions, which are not based on the progress made by the actual sales representatives, in function of Contracted Monthly Recurring Revenue (CMRR) (Byron, 2008) lead to overstaffing, cash shortfalls and exaggeration of SG&A expenses.

6. Adopting traditional cost structure within new SaaS set-up

As previously stated companies have a huge tendency to follow on-premise logic and try to please all customers' requirements and supply all special features. This, unwillingly, obliges the would-be SaaS vendor to stay within traditional "multi-instance, single-tenant" set-up, while the ultimate goal is to evaluate and adapt "single-instance, multi-tenant" structure, which reasonably has to lead to cost advantages and mono-structure with a low TCO value proposition.

Working within traditional framework, with the only difference that the same license software is now provided via Internet, prohibits company to fully exploit all competitive potential, own to on-demand business model. Disaggregating customers leads to different business processes, different purchase processes, different pricing models and different support processes. For this reasons, following differentiation strategy, which causes gigantic operational cost, is "*[...] where most SaaS companies lose their way, or rather find their way to long term unprofitability*" (York, 2009, p.3).

7. Focusing on complex/extremely customized solutions

Another mistake many companies make, trying in this way to create a competitive advantage, is to provide a highly customized solution, underlying this way customer's differentiation and solution's inimitability. However following this strategy, customized service provider becomes the victim of its own intentions. Focusing on the needs of ultimately single customer, cost disadvantages arise on multiple dimensions. Firstly, the aggregation and scale economies are eliminated, due to the narrow customer base, leading to arising operational costs. Secondly, providing a highly customized solution, limits the potential target segment, this way decreasing the potential of future revenue generation.

What's more, from the research made by McKinsey, some business applications (Dubey & Wagle, 2007) are just not recommended to be provided on-demand, due to the lack of business potential and which are unlikely to migrate to on-premise setting in general, even after reasonable time (see FIGURE 34).

	Security management	Identity, access management	Secure content management	Threat management	Security and vulnerability management
Infrastructure management	Storage management	Backup, archival software	Storage resource management	Storage replication	File system software
	System management	Change, configuration management	Performance management	Event automation / job scheduling	Network and service management
Development, integration tools	Application, development deployment	Development tools	Integration deployment tools		
	Enterprise resource management	Financial applications	Payroll	Human-Capital Management	Customer Relationship Management
		Engineering applications	Product Life cycle management	Project management	Business intelligence
Core business application	Supply Chain Management	Product Planning	Inventory Management	Procurement	Logistics
	Collaboration, Communication	IP telephony	Messaging Applications	Conferencing Applications	
	Content applications	Authoring applications	Web content management	Web analytics	Document and record management
	Information marketplace	Information services	Search tools	E-commerce (online store-front)	
	Niche applications	Location based services			

LE	SME	Likely to migrate in 3 years	Already migrated
		Not applicable (application associated with hardware)	Unlikely to migrate



pace of migration varies among different customer segments

FIGURE 34: MIGRATION OF APPLICATIONS FROM TRADITIONAL DELIVERY TO SOFTWARE AS A SERVICE
(Dubey & Wagle, 2007)

5. Future Trend

[...*The market will show consistent growth [21% per year] through 2013 when worldwide SaaS revenue will total \$16 billion for the enterprise application markets.*] (Gartner, 2010)

[...*The latest forecast predicts the SaaS market to hit \$14 billion in 2013.*] (Weier, 2009)

[...*The Stamford, Conn. research firm said worldwide IT spending will hit \$3.4 trillion for 2010, a jump of 5.3 percent from 2009's \$3.2 trillion IT spending. And that growth will continue into 2011 when IT spending is expected to surpass \$3.5 trillion, a 4.2 percent increase from this year.*] (Hickey, 2010)

[...*It has been estimated that the software as a service (SaaS) market will be worth £146.5 billion by 2015 as more businesses seek cost-effective solutions.*] (Outsourcery News, 2010)

The SaaS trend watchers as Gartner, Forrester or IDC are more than optimistic about SaaS future as can be seen from the above mentioned statements. The near terms (period between 2010 and 2013) prospects approximate 21% yearly growth in revenue. Long term (period after 2013) perspectives predict that SaaS will bypass the on-premise licensed software sales in 2015 (Hall, 2006).

In order to understand this positive expansion, we provide a brief **trend analysis on very recent evolution** (compared to the discussion on SaaS evolution on p. 4) within SaaS development and discuss the **current circumstances** that will cause this tendency for SaaS adoption and accelerated proliferation of SaaS business model.

The direction in which SaaS based applications evolve can be presented by means of the so called **SaaS Waves** (see FIGURE 35). Saugatuck research distinguishes three different development eras, namely **SaaS 1.0**, **SaaS 2.0** and **Cloud Computing**. Each era builds on the predecessor in terms of business processes and customer complexity. With other words [...*the focus of SaaS shifts from cost-effective delivery of stand-alone application services (Wave I), to integrated business solutions enabled by web services APIs and ESBs (Wave II), to workflow-*

and collaboration-enabled business transformation (Wave III), leading to measured, monitored and managed business processes (Wave IV)] (McNee, 2008).

SaaS adoption rates will vary highly between and within the markets, but the general trend that we have identified in our qualitative research is that the penetration will be present in both directions:

- **vertical-specific solutions** which are offered within existing accounts as part of the service portfolios or through partners
- **horizontal applications with common processes** among distributed virtual workforce teams and within Web 2.0 initiatives

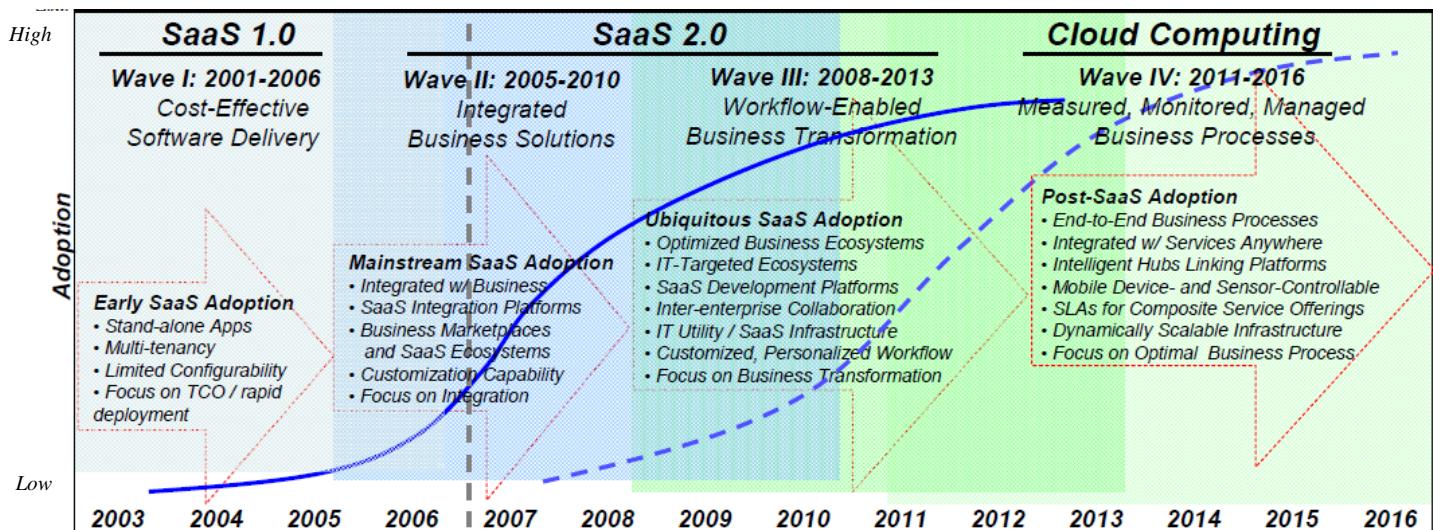


FIGURE 35: BEYOND SOFTWARE AS A SERVICE: CLOUD COMPUTING (McNee, 2008)

These expectations converted into the numbers and classified by the industry application, lead to the results presented in TABLE 10. The adoption leaders are the Content, Communication and Collaboration (CCC) applications and those focused on Customer Relationship Management (CRM) practices. This is also easily explained, as those applications belong to the Wave I and Wave II solutions, which are highly matured (well developed, tested, improved and adapted to the SaaS environment). The growth of Supply Chain Management (SCM) and Enterprise Resource Planning (ERP) solutions is constrained by the implementation and integration complexity.

Enterprise Application Software Markets	2008	2013
Content, Communications and Collaboration (CCC)	2,16	5,07
Office Suites	1,36	1,86
Digital Content Creation (DCC)	0,07	0,37
Customer Relationship Management (CRM)	1,84	4,02
Enterprise Resource Planning (ERP)	1,26	1,96
Supply Chain Management (SCM)	0,75	1,65
Total Enterprise Software	7,44	14,93

TABLE 10: WORLDWIDE SOFTWARE REVENUE FOR SaaS DELIVERY WITHIN THE ENTERPRISE APPLICATION SOFTWARE MARKETS (BILLIONS OF DOLLARS) (Pettey & Stevens, 2009b)

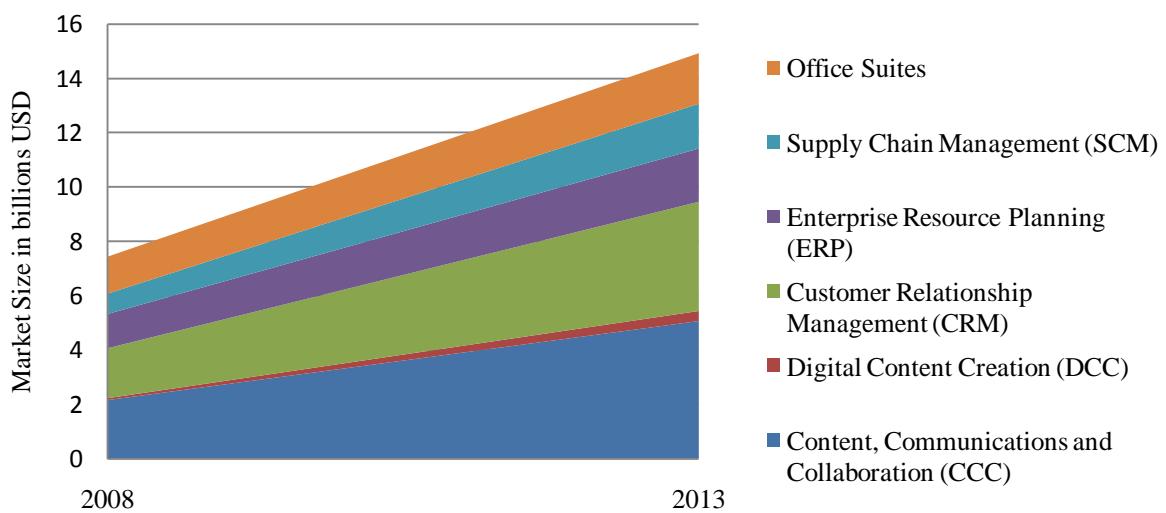


FIGURE 36: WORLDWIDE SOFTWARE REVENUE FOR SaaS DELIVERY WITHIN THE ENTERPRISE APPLICATION SOFTWARE MARKETS (BILLIONS OF DOLLARS)

The SaaS evolution, represented in numbers (as given above), does not explain which **role** the SaaS based solution going to play **within SaaS ecosystem**. Therefore we present five possible **scenarios** (Guptill & McNee, 2009), as identified by the Saugatuck research in 2009 (see APPENDIX 5.1: Saugatuck SaaS Scenarios).

- By 2014, SaaS applications will focus on the **niche** market where adoption is limited to departmental or divisional initiatives and where it will be employed only as useful components of larger corporate systems.
- SaaS fails to substitute the on-premise software applications, but still causes significant transformation within software vendor and IT client relationship as **agent of change**.

- **Defence of the entrenched:** this scenario suggests that the Software + Services (supra, p. 50), or the hybrid model will dominate, as the majority of the customers will be rediscovering the traditional licensed software in combination with cloud infrastructure.
- SaaS solutions become the **integrated and integral** part of the firm's IT systems, on the level of infrastructure, operations and development. SaaS providers assume the tasks of IT system management, while internal IT department focuses on SaaS vendors' (operational) portfolio management.
- Under **utility world** scenario SaaS [...] *becomes de facto IT for the majority of the user firms*. IT department functions shift from operational (budgeting and planning) to strategic solutions portfolio management.

The second facet, namely the current macro circumstances which stimulate this trend, are expounded using the **PESTLE framework** (see FIGURE 37), which comprises Political, Economic, Social, Technological, Environmental and Legal drivers (Blatman, Robinson, Callewaert, 2009).

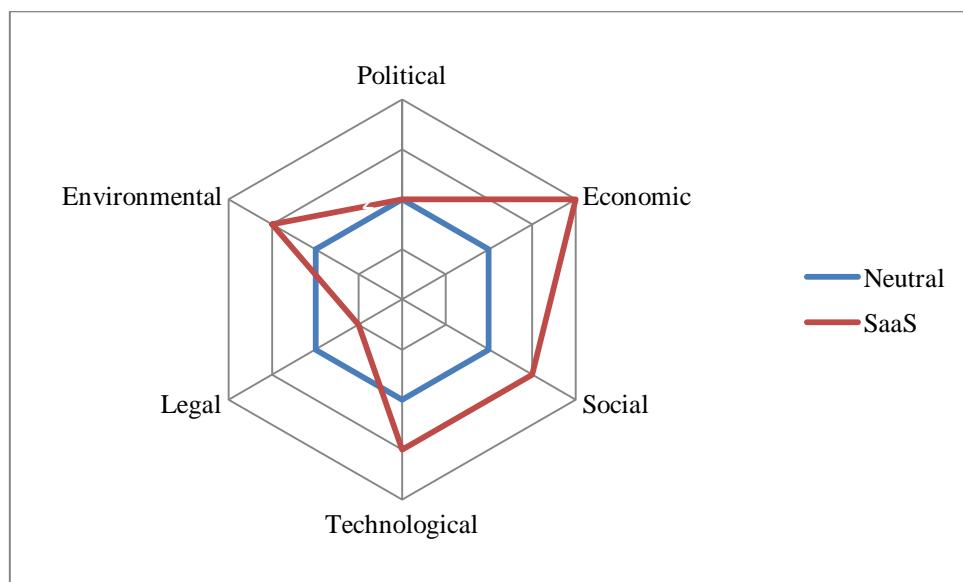


FIGURE 37: EXPECTED IMPACT OF MACRO TRENDS ON CLOUD COMPUTING ADOPTION GROWTH (Blatman, Robinson, Callewaert, 2009)

Political axle is one of the elements that will affect the SaaS adoption in a neutral to negative way. Reason lies behind the fact that even with agreements such as Safe Harbour Act between the US and EU (supra, p. 67), issues on security, privacy, ownership and location of data are still pending and have to be resolved in order to facilitate the global SaaS adoption.

Economic circumstances as financial crisis, the current economic downturn with consequent tighter IT budgets will claim [...*leaner alternatives with rapid deployment and rapid ROI, less upfront capital investment*]. (Blatman et al., 2009) The answer to the requirements posed by the economic contemplations is provided by the rationale behind the SaaS delivery model.

Increasing popularity of social interactions appearing on internet, for personal (e.g. Facebook, Netlog, Twitter, etc) or professional (Google Buzz, LinkedIn, Digg, Delicious, etc.) means, constitute the **social** element. A research reveals that by 2015 70% of the companies will be using the private or internal cloud, which will be delivered as SaaS (Blatman et al., 2009). Higher social acceptance of the new on-line delivery way will also encourage the faster widespread SaaS adoption among enterprises.

Next to the economic circumstances, **technological** developments will highly promote the SaaS adoption. Firstly, enabling technologies are becoming commoditized, what will consequently drive the cost down. Secondly, companies are [...*further encouraged by the fact that with SaaS, responsibility for continuous operation, backups, updates and infrastructure maintenance shifts risk and resource requirements from internal IT to vendors or service providers*]. (Blatman et al., 2009) However, initial concerns about security, response time and service availability may still form an impediment for many organizations.

Current **environmental** trends which pursue the creation of leaner and greener enterprises will indirectly stimulate the SaaS adoption. The higher infrastructure utilization of the SaaS-based solutions minimizes the CO₂ emissions.

Insufficient **legislation** on confidentiality and IP issues may preclude the future international growth. Free flow of information between countries has to be harmonized as there is no common global legal framework available today (Save Harbour Act is limited to US and EU relationships).

6. SinYate: real world example

In previous parts of our dissertation we primarily focused on the theoretical and more general background of SaaS, elaborating on the analysis of SaaS as a business model, its ecosystem, advantages and disadvantages compared to the on-premise solution and the success and failure factors, accompanying the implementation of SaaS. In this part we abandon the theoretical analysis and take a role of SaaS implementers in order to find the best on-demand solution for a young start-up company SinYate, currently passing the incubator phase and intending to provide the services under a SaaS model.

Firstly, we give an explanation on the services, offered by SinYate. Secondly, we make an analysis of the company's strategy and the way the strategy would be realized, based on the Hamel framework. And finally, we will elaborate on more technical part, pointing out the architecture behind the SinYate platform.

6.1. SinYate Offer

*“SinYate’s mission is to support the **new mobile revolution** by improving the quality of mobile applications through the **automation of test processes**. ”* (SinYate, 2009)

As it is clear from the SinYate’s mission statement, the young company targets the emerging market of mobile applications, focusing on the testing segment. To be more precisely, SinYate offers a **platform** which allows web designers, mobile operators and mobile web transcoders to **test in a full automatic way** the customer experience of **rich mobile internet sites**. (SinYate, 2009)

As explained by the developers³³ of the platform, via pre or custom defined metrics, developers and decision makers can test and adapt the mobile web sites, based on analytical reports. The report contains scores on different metrics and is guidance to optimization of customer mobile

³³ The platform is developed by two masters engineering Thomas Mons and Zhong Yuan Xu, supported by Siruna (URL: <www.siruna.com>), a mobile internet technology provider, and IBBT (www.ibbt.be), a leading Belgian public research institute for Broadband Technology and associated with the universities of Ghent, Leuven and Brussels.

experience. The tests are done on real devices or emulators, what provides superior accuracy and guarantees that the mobile website performs appropriately on all tested mobile devices.

During the analysis of the SaaS ecosystem we explicitly mentioned the increasing competitiveness of the SaaS market and relatively high bargaining power of customers due to the low switching costs (supra, p. 53). As a consequence, the SaaS providers must try to differentiate themselves from their competitors in order to attract new and to retain the existing customers.

In order to analyze in what extend SinYate offers unique and attractive services and differentiates it from the competitors, we make a use of a Hamel framework (Hamel, 2000).

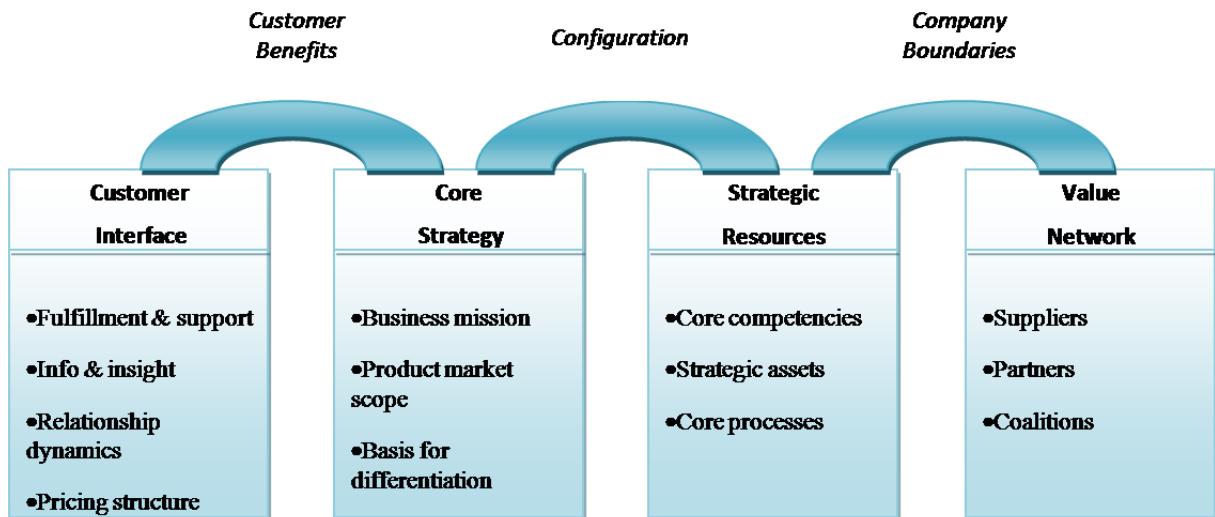


FIGURE 38: HAMEL FRAMEWORK (Hamel, 2000)

The core of the framework is composed of the **four basic elements** - *customer interface, core strategy, strategic resources and value network* – each covering three to four related aspects, as displayed in FIGURE 38. Those basic elements are connected through the **three links**, being *customer benefits, configuration and company boundaries*. Let us apply each of those elements to the SinYate offering, starting with the Core Strategy, followed by Strategic Resources, Customer Interface and ending with the Value Network.

6.1.1. Core Strategy

According to Hamel (2000), the **core strategy** of the firm is represented in the three important elements, namely *business mission*, *product/market scope* and *basis for differentiation*. The core strategy forms actually the starting point of a business and at the same time determines the goal to be achieved through the appropriate use of strategic resources and available capabilities.

- As already mentioned at the beginning of this chapter, SinYate's mission, which describes the objective of the strategy, is “[...] to support the new mobile revolution by improving the quality of mobile applications through the automation of test processes.” (SinYate, 2009). In other words, SinYate wants to provide automatic mobile testing platform, addressing the emergent market of mobile rich internet applications (RIAs).
- For a startup company as SinYate it is of great importance to decide which customers and markets – national and/or international – to target and what kind of product mixes to compose, determining in such a way the *product* and *market scope* of the business.

Seen the SinYate's intention is to address the market of mobile rich internet applications, it seems most appropriate to focus firstly on the **mobile web developers** and **mobile web transcoders** active in the same mobile RIAs market. The SinYate's mobile testing platform can be evaluated by these potential customers as a service, which adds value to their final delivery by improving the quality of the mobile website and resulting in higher satisfaction and advanced mobile experience among the end users. Next to the web designers and transcoding companies, the **mobile operators** (e.g. Mobistar n.v.³⁴) and the **suppliers of the high end mobile devices** (e.g. Apple) also belong to the startup's potential customers.

All those targeted customers have a choice between three kinds of service packs – *development pack*, *productivity pack* and *individual tests* - dependent on the frequency of the executed tests and required features.

- The **productivity pack** is targeted towards *production environments*, where it is crucial to be able to test a certain web application quickly, in most cases after an error has been reported. To ensure the speed requirement, only basic testing is performed (taking screenshots, HTTP/server errors) and reporting is kept brief.

³⁴ More on the company on <<http://www.mobistar.be/>>

- The **development pack** is targeted towards *web agencies* and *mobile integrators* (or any other companies that develop mobile web applications). In these environments, it is important to test thoroughly and to deliver detailed test reports that allow efficient fixing of errors. Therefore, the development pack offers such aspects as thorough testing (crawling, deep analysis), intelligent, detailed reporting (including regression reporting) and the possibility to schedule tests.
- The offering of **individual tests** targets everyone who *occasionally* wants to use the platform. Potential customers are small web developers, developers that would like to try out the platform or companies that would like to assess the quality of their mobile web application.

TABLE 11 gives an overview of all the features and options, which are included in the various service packs.

Included features	Service pack	Individual Tests	Productivity Pack	Development Pack
Screenshot mosaic	X	X	X	
Basic error reporting (HTTP/server errors)		X	-	
Scheduling	-	-	-	X
Crawling	10 pages	-	-	20 pages
Advanced & intelligent reporting	X	-	-	X
Regression reporting	-	-	-	X
Support	-	X	X	
Max. number of different test campaigns	1	10	10	1
Cumulative test runs	1	100	100	60
Number of devices	10	50	50	10
Devices (per run)	4	15	15	10

TABLE 11: SINYATE MOBILE TESTING SERVICE PACKS

Regarding rather limited Belgian market potential, the SinYate team plans to leave the national borders and to search for the customers on the international markets from the first days of the activities, starting from neighboring countries and expanding all over the world, what seem to be feasible with the delivery of the service over the internet.

- In order to attract the customers and to survive the competition with the incumbents of the mobile applications testing market, it is important to determine the *basis for differentiation* or in other words to describe how the company competes differently from its competitors.

The major difference with the existing market players, which are described in the TABLE 12 below, lies in the fact that SinYate offers **fully automated** platform, which allows executing the tests on the **real devices** and provides the possibility to choose between basic and more enhanced **analytical reports**.

	Description	Testing	Devices	Reporting
W3C Mobile OK Checker ³⁵	This checker performs various tests on a Web Page to determine its level of mobile-friendliness.	manual	no real devices	Limited to - page size - network usage - results on 26 metrics
Device Farms	Banks with attached real devices, which can be connected through the internet.	semi-automated	real devices	- Very limited reporting - Not possible to calculate results based on defined metrics
DotMobi ³⁶	Offers free mobiReady™ tool, which evaluates mobile-readiness using industry best practices & standards.	semi-automated	emulators	- readiness scoring (1 to 5) - in-depth analysis of pages
TestQuest ³⁷	Offers testing tools which adapt to almost any test environment, using device- and OS-independent components to provide a wide range of automated tests.	automated	emulators	PC based diagnostic monitoring application, which provides the limited reports
Keynote ³⁸	Provides independent testing and monitoring of mobile content, applications, and services	real devices	real devices	Intuitive reports and graphs showing detailed performance and availability metrics.

TABLE 12: EXISTING PLAYERS ON MOBILE APPLICATIONS TESTING MARKET

³⁵ More on the services of the company on <<http://validator.w3.org/mobile/>>

³⁶ More on the services of the company on <http://ready.mobi/launch.jsp?locale=en_EN>

³⁷ More on the services of the company on <<http://www.testquest.com>>

³⁸ More on the services of the company on <<http://www.keynote.com>>

During the comparison of SinYate with the existing and already established market players, the customers would probably wonder what are the **benefits** of the automated testing on real devices with the provision of the analytical reports? First of all, automated testing results in *time saving* such that the customers can execute a greater amount of tests during the same period of time in contrast to the time consumed during manual testing. Secondly, testing on real devices provides realistic and reliable results compared to the testing on simulators. At third, the analytical reporting gives clear overview of the testing results, providing the scores on each metric and guiding the tester on the possible optimization of the mobile website.

6.1.2. Strategic Resources

The realization of the intended core strategy, described here above, is not feasible if the firm does not possess the strategic resources, composed of the three elements, being the *core competences*, *strategic assets* and *core processes* (Hamel, 2000).

- *Core competencies* are skills and capabilities of the firm, needed for the development of the product. Own to the technical nature of the services, offered by SinYate, the major competencies of the company are represented by the **IT knowledge** (know-how, know-when and know-why) of the technical developers, who are responsible for the actual development of the mobile testing platform. Furthermore, SinYate benefits from the support of the experienced Siruna³⁹, IBBT⁴⁰ and University of Ghent professionals, which can be seen as a **bootstrapping** strategy what is very valuable for the young startup.
- Seen the fact that SinYate operates in the IT industry targeting the on-demand applications market, the actual **testing platform** represents the most important **strategic asset** of the company.
- From the definition analysis of core processes, key activities are those that create added value to customer from resources and assets. Applied to SinYate, it is obvious that the **development** of the test platform and the **delivery** of the tool on a SaaS basis belong to the **key activities** of SinYate.

³⁹ Siruna is a managed solution provider for mobile internet websites. The provider helps companies bring their online content to any type of mobile device. More about Siruna on <<http://www.siruna.com/>>.

⁴⁰ IBBT (Interdisciplinary Institute for Broadband Technology) is an independent research institute founded by the Flemish government to stimulate ICT innovation. The IBBT team offers companies and organizations active support in research and development. More information on the activities of IBBT can be found on the company website <<http://www.ibbt.be/en>>.

As often told during the various management and strategy courses, the successful realization of the postulated strategy does not solely depend on the acquirement of the most brilliant resources, but on the possibility to combine the available competencies, assets and processes in the unique way in order to create the competitive advantage and to differentiate from the competitors. In Hamel framework the ability to achieve this unique combination is represented by the *configuration* aspect, which links the core strategy with the strategic resources (Hamel, 2000). SinYate tries to achieve this uniqueness by complementing the young talented development team with the experience of the industry captains as Siruna and IBBT.

6.1.3. Customer Interface

Customer interface element covers four important aspects – *fulfillment and support, information and insight, relationship dynamics* and *pricing strategy* - which describe how the service is offered and delivered to the customer, influencing the relationship with the latter (Hamel, 2000).

- *Fulfillment and support* describes the way the firm reaches and supports its customers. As it is already obvious, SinYate tends to deliver its application on the SaaS basis, which incorporates completely different channel strategy than in case of on-premise software. (supra, p.19)

In our opinion, SinYate has three possibilities to attract potential customers. First of all big customers, as for example mobile operators (e.g. Mobistar n.v.) or the producers of mobile devices (e.g. Nokia) are best reached through the **direct sales** force. Secondly, SinYate can build up the customer base through the **partnership** with the relative industry players as (mobile) web designers, mobile web transcoders (e.g. Siruna) and the providers of the mobile website creation services (e.g. Osmobi⁴¹) by offering the packaged solution. Finally, SinYate can introduce the **affiliate program** on a commission basis such that the customers reach SinYate via the banners on other websites.

From the moment the potential customers become the real ones, it is very important to ensure effective and quick support. If customer faces some problems, various support alternatives exist. Firstly, the user of the mobile testing platform can consult the **FAQ** (Frequently Asked Questions) and/or **HELP** section. In more urgent

⁴¹ OSMOBI is a web service to make Drupal, Joomla! and Wordpress sites mobile with great ease and great power. More about Osmobi on <<http://www.osmobi.com/>>

situations, SinYate provides **HotLine support**, available 24 hours a day, 7 days in a week. Furthermore, SinYate plans to offer **training** and **consulting services** for customers, who need some guidance on the use of the application.

- *Information and insight aspect* describes the collection and use of information on customer behavior and habits. It is crucial for SinYate when considering the importance of meeting the customer needs and developing the additional functionalities and features. **FAQ/HELP sections** and **HotLine support** are one of the sources of information on customers, their requirements and even complaints. Furthermore, the platform offers the possibility to collect the **statistical data** on, for example, the testing frequency of particular customer, the tests mostly used in general, less popular tests, etc.
- The nature of interaction between the customer and the firm is reflected in the *relationship dynamics*, which differs between various customers dependent on the SLA's, the duration of the contract and the usage frequency. It is obvious that customers, who use the services only once (e.g. private developer, who wants to test the website, mobilized with Osmobi) does not search for the tough relationship with continuous support and frequent interaction. Otherwise, efficient and even value-adding interaction is crucial for the long-term relationship with such customers as the website transcoders and mobile operators, who will use the mobile web testing on a continuous basis.
- The last but very important aspect of customer interface is the *pricing strategy*, which refers to the combination of different pricing methods. SinYate makes a distinction between three pricing strategies, namely per-year-based, per-project-based and run-based, in relation to the three service packs (supra, p. 85), all represented in TABLE 13 below.

Pricing	Service pack	Individual Tests	Productivity Pack	Development Pack
Payment		per run	per year	per project
Basic price		€50	€4000	€4000
Extra devices		€15 per 1	€1000 per 5	€1000 per 5
Extra TC runs (per device)		-	-	€225 per 40

TABLE 13: SINYATE PRICING STRATEGY

6.1.4. Value Network

After the core strategy is defined, the strategic resources, needed to realize the intended strategy, are identified and the customers to target are determined, it is time to leave the internal boundaries of the company and to work out the **value network** around SinYate, deciding on potential *suppliers* and *partners* of the startup.

Seen the fact that the testing services will be offered on the SaaS basis, we firstly have to search for the suppliers of the services or products, needed to set up the required SaaS infrastructure, which consists of the three layers, namely infrastructure (IaaS), platform (PaaS) and application layer (supra, p. 25). As will be explained later in the text (infra, p. 93), the development of the platform and application layers will be accomplished internally, such that SinYate has to look only for the appropriate IaaS provider as the supplier of the reliable infrastructure.

Furthermore, taking into account that the testing will be performed on real mobile devices instead of the simulators, SinYate has to either use the services of the device banks (e.g. Device Anywhere) or address the producers or distributors of high-end mobile devices as the suppliers of required smart phones. SinYate also considers the possibility to build more trustful relationship with the providers of real devices in the form of the partnership enriching the value of each other's offering.

Finally, as already mentioned previously (supra, p. 88), SinYate is partnering with Siruna and IBBT, which extensively support the developers by providing professional advice and sharing the IT and commercial expertise.

FIGURE 39 gives an overview of SinYate's value network or *company boundaries* as also called by Hamel, including the suppliers, partners and potential customers of the company.

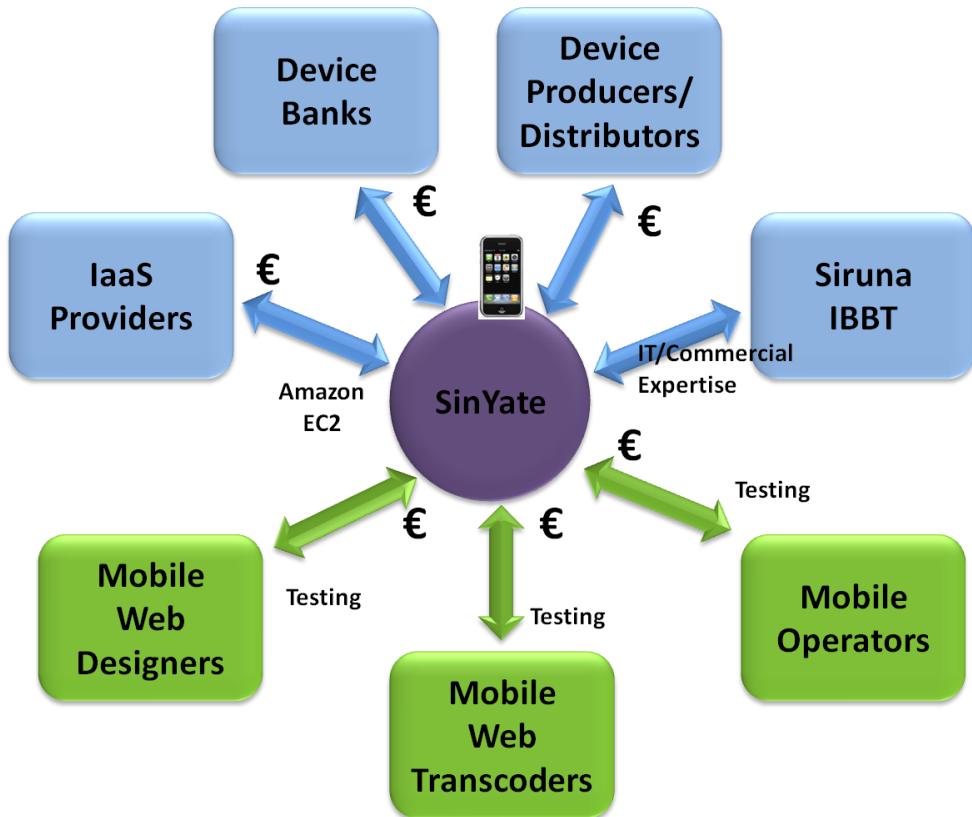


FIGURE 39: SINYATE VALUE NETWORK

On the next page the reader is presented with the TABLE 14, which summarizes the analysis of all the elements of Hamel framework, applied for SinYate.

CUSTOMER BENEFITS	CONFIGURATION	COMPANY BOUNDARIES	
Time saving (vs. manual testing) Reliable testing on real devices (vs. emulators) Consultative reporting (incl. reports on demand)	Young talented development team complemented with the experienced industry captains	Partnering with Siruna/IBBT IaaS outsourced to Amazon.com Possible partnership with device banks	
CUSTOMER INTERFACE	CORE STRATEGY	STRATEGIC RESOURCES	VALUE NETWORK
<p>Fulfilment:</p> <ul style="list-style-type: none"> - SaaS based delivery - Direct sales force - Partnerships - Affiliate program <p>Support:</p> <ul style="list-style-type: none"> - FAQ/Help section - HotLine support (24/24) - Training/consulting services 	<p>Business Mission:</p> <p>Provide automatic testing platform, addressing Mobile RIAs in a SaaS model</p>	<p>Core Competences:</p> <ul style="list-style-type: none"> - Bright engineers - IT knowledge - Support by market professional as Siruna and IBBT 	<p>Suppliers:</p> <ul style="list-style-type: none"> - IaaS Provider (Amazon.com) - Mobile devices producers/distributors
<p>Information & Insight</p> <ul style="list-style-type: none"> - FAQ/Help section - HotLine support - Statistical data <p>Relationship Dynamics:</p> <ul style="list-style-type: none"> - Efficient, value-adding interaction with and support for trust customers 	<p>Market Scope:</p> <ul style="list-style-type: none"> - Mobile web designers - Mobile web transcoders - Mobile operators - Providers of high-end mobile devices - (Inter)national Markets <p>Product Scope:</p> <ul style="list-style-type: none"> - Productivity Pack - Development Pack - Individual Tests 	<p>Strategic Assets:</p> <ul style="list-style-type: none"> - Testing platform in latest stage of development 	<p>Partners:</p> <ul style="list-style-type: none"> - Siruna/IBBT - Device banks - Mobile devices producers/distributors
<p>Pricing Strategy:</p> <ul style="list-style-type: none"> - Per-year based (Productivity Pack) - Per-project based (Development Pack) - Run based (Individual Tests) 	<p>Basis for Differentiation:</p> <ul style="list-style-type: none"> - Fully automated testing platform - Real devices - Analytical reporting 	<p>Core Process:</p> <ul style="list-style-type: none"> - Technical development - SaaS based delivery 	

TABLE 14: THE OVERVIEW OF HAMEL FRAMEWORK APPLIED FOR SINYATE

6.2. SinYate Architecture

As stipulated in chapter 2 (supra, p. 24) during the theoretical analysis of the infrastructure behind SaaS, the SaaS developers must arrange an appropriate supporting infrastructure, building up the suitable logical architecture, choosing the right maturity level and deciding on the most reliable database architecture and authentication system, simultaneously keeping in mind the connectivity, business continuity and security considerations. In this part of our master dissertation we apply the theory around the SaaS infrastructure on the SinYate testing platform in order to identify the best architectural solution, which will allow the company to meet the customer needs in the most effective and efficient way.

6.2.1. Logical architecture

As the reader already knows, (supra, p. 24), the SaaS is build up of the three major layers, namely infrastructure, platform and application layer. Taking into account the cost consideration and the availability of the necessary resources and capabilities, it is crucial to make a right decision whether to deploy all the three layers internally or to outsource the first and/or second layer.

In order to make a right outsourcing decision, let us first take a look on the architecture behind the SinYate mobile testing services. As can be seen on FIGURE 40, Java virtual machine and MySQL for data storage form the base of the SinYate testing platform. Furthermore, there is some supporting middleware consisting of OSGi™, Jetty Server, Log4J, Quartz and Hibernate. Finally, on the top one can find the Graphical User Interface (GUI) (Mons & Yuan Xu, 2009). Here below, the reader finds the explanation on the middleware components of SinYate architecture.

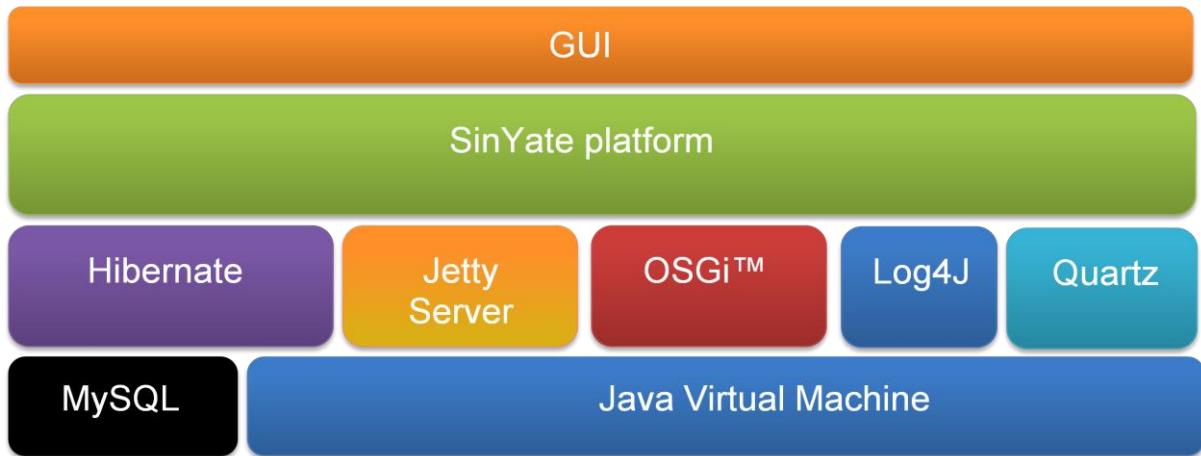


FIGURE 40: SINYATE ARCHITECTURE (Mons & Yuan Xu, 2009)

- **OSGi™** framework is a module system and *service platform* for the Java programming language that implements a complete and dynamic component model. (OSGi™, 2010) The bundles, which represent the application or component can be remotely installed, started, stopped, updated and uninstalled without requiring a reboot. The service registry allows bundles to detect the addition of new services, or the removal of services, and adapt accordingly. According to the developers of SinYate platform “*OSGi simplified [...] architecture, as it was no longer needed to keep track of devices, test modules or metrics: the OSGi bundle repository would do just that.*” (Mons & Yuan Xu, 2009, p.76)
- **Hibernate** is an ORM (Object-Relational Mapping) framework, which provides capability to *interact with database* in an object oriented way (Bhatt, 2010). Hibernate supports a large number of database management systems as Postgres, MySQL, Oracle and Microsoft SQL server through the use of SQL dialects. (Mons & Yuan Xu, 2009)
- **Jetty** is a pure Java-based HTTP server and servlet⁴² container (application server). (The Eclipse Foundation, 2010) The choice of Jetty server is justified by its capability to serve static and dynamic content either from a standalone or embedded instantiations, to provide web services in an embedded Java application and to support the OSGi framework (Mons & Yuan Xu, 2009). Furthermore, Jetty components are open source and available for free for commercial use.

The Jetty Server is used for the web GUI and the communication with the devices attached to the platform.

⁴² A servlet is a Java class which conforms to the Java Servlet API, a protocol by which a Java class may respond to http requests. Thus, a software developer may use a servlet to add dynamic content to a Web server using the Java platform.

- **Quartz** is a full-featured, open source, job *scheduling* system that can be integrated with or used alongside virtually any Java application. Quartz can be used to create simple or complex schedules for executing tens, hundreds, or even tens-of-thousands of jobs. The jobs created with Quartz can be scheduled in any way (OpenSymphony, 2005). The testing platform will use Quartz mainly to schedule test campaigns. Quartz is crucial for the automation of the testing platform, what belongs to the key differentiator of SinYate services.
- **Log4J** is a Java-based logging utility, offered for free by Apache Software Foundation under the Apache license⁴³ (Log4J, 2010). Log4J is used for the implementation of the logging and authentication functionalities.

All those aiding and enabling components described here above form the platform (PaaS) layer. On the top of all those components lies the actual testing platform, which is a group of OSGi bundles working together, which belong to the application layer of SaaS. Seen the fact that platform and application layers are already developed, using the frameworks, available for free, only the first infrastructure layer must be outsourced to the IaaS provider.

From the comparison of different IaaS providers (see TABLE 15), made by JMP Securities analyst Patrick Walravens, Amazon EC2, offered by Amazon.com, seems to have the most cost-effective IaaS proposition.

	Amazon EC2	GoGrid	Rackspace Cloud Services	Jouent	AppNexus
Base Price	\$0.4 x 30 days x 24 hours = \$288	8 GB x \$0.08 x 24 x 30 = \$461	\$0.48 x 24 hours x 30 days = \$346	\$1000 + \$80 (amortized setup fee)	\$247 x 4 cores x (1 + 3.5%) = \$1022
Storage Cost (50GB)	50GB x \$0.15 = \$2.7	40 GB x \$0.15 = \$6 (First 10GB free)	Inclusive	Inclusive	\$100
Data Transfer Cost (10GB in, 10GB out)	\$0.1 x 10 + \$0.17 x 10 = \$2.7	\$5	\$0.22 x 10 + \$0.08 x 10 = \$3	\$1.50	\$30 x 10 + \$40 x 10 = \$700
Other Cost	\$1.20	None	None	\$5	*\$75 x 2 + \$300 = \$450
\$ per VM	\$300	\$472	\$349	\$1110	\$2238 - \$3000 (plus setup fee)

*Refers to Support Cost: Assumes 2 email/phone (2x\$75) support events and one application troubleshooting (\$300) in a month

TABLE 15: PRICING COMPARISON AMONG IAAS PROVIDERS (Walravens, 2009)

⁴³ Apache license is a free software license authored by the Apache Software Foundation (ASF). The Apache License requires preservation of the copyright notice and disclaimer, but it is not a copyleft license — it allows use of the source code for the development of proprietary software as well as free and open source software.

6.2.2. Maturity model

The next decision concerns the choice of the maturity level which depends on how **scalable**, **multi-tenant-efficient** and **configurable** (supra, p. 25) the SaaS application should be in order to meet all the functional requirements, defined by the developers.

In order to make a right decision on the appropriate maturity level, let us first give an overview of the functional requirements, which were identified based on the shortcomings of the existing testing solutions and on feedback received from some potential users (e.g. mobile web agencies). (Mons & Yuan Xu, 2009) The developers of the platform make a distinction between platform and client⁴⁴ requirements, listed in TABLE 16 below. The reason for this distinction lies in the fact that “[...] these clients are not an integral part of the platform and can be developed completely independently” (Mons & Yuan Xu, 2009, p.30).

PLATFORM REQUIREMENTS	CLIENT REQUIREMENTS
Support most popular real devices, simulators, device banks, OS and browsers	Be able to communicate with the platform through a predefined XML-based protocol
Support any kind of network technology (GPRS, EDGE, 3G,...)	Be able to register the new client and remember the credentials for the authentication processes in the future
Track the status of the connected devices	Send regular heartbeats to the platform to enable the tracking of the device status by the platform.
Support new devices without altering the platform	Save and use the new configuration, after receiving the configuration update from the platform
Add new kinds of tests and reports without restarting the platform	Execute given assignments in the exact order as received from the platform
Communication, reporting and storage components must be able to cope with the various changes (e.g. addition of new tests, reports)	Ensure the pull based communication with the platform in order to bypass the firewalls layers.
Be able to schedule tests for future execution	Foresee a mechanism to support new kinds of assignments with a minimal ripple effect to the rest of the system.
Allow end-users to define new test campaign through a user-friendly interface	
Enough configuration: - Provide user with the full control on the used devices and tests and generated reports	
Evolve easily with time: - Easy to add or change metrics, devices and testing modules	

TABLE 16: FUNCTIONAL REQUIREMENTS OF SINYATE PLATFORM

⁴⁴ Clients referring to the client application

In order to meet all those requirements in most efficient and cost-effective way, the testing platform must be enough **configurable** and **multi-tenant efficient**, which corresponds to the **third maturity level**. As explained previously (supra, p. 25), designing the SaaS infrastructure according to this maturity level results in efficient exploitation of the resources by hosting a single instance, which serves all the customers, who will share the same application, running on the same operating system, on the same hardware, with the same data storage mechanism. The high level of configurability will allow providing customized testing solutions by offering the possibility to compose the necessary test campaign on the various real devices with the provision of basic or advanced analytical reporting. The scalability aspect must not be neglected too seen the SinYate's potential to operate on the international scale and to grow continuously. But the developers of the platform are sure that the scaling up measures will be sufficient to meet the increasing system load, such that there is no need to consider the highest maturity level, which involves higher operating costs.

6.2.3. Data-architecture

When deciding on the design of the appropriate database system, the SinYate developers must evaluate some technical and business considerations in order to set up the most suitable data-architecture, choosing between more isolated (isolated databases vs. isolated schemes) or more shared approach (shared schemes). Based on the description of the possible data-architectures in chapter 2 (supra, p. 27) of our master dissertation, we first make a comparison between the isolated and shared options evaluating some economical and technical considerations, represented in TABLE 17.

The second column in the table indicates the importance of the particular consideration for SinYate. Taking into account the startup status of the SinYate, which incorporates the limited funds available for the development and launching of the platform, the initial investment consideration belongs to the highest importance category. Furthermore, it is also very crucial to keep the operational costs as low as possible trying to benefit from the economies of scale, increasing the chance for survival during the period of negative cash flows. Facing the existing resistance from the potential customers to the cloud services due to the lost ownership of and control over the data, the security issue is also ranked as highly important. What is more, most of the customers request the isolation of their data from the data of other customers as compensation to the lack of data control.

		Criticality ⁴⁵	Isolated Databases	Isolated Schemes	Shared Schemes
Initial investment⁴⁶		1	+	++	+++
Operational costs^a		1	+++	++	+
Security		1	+	+	+
Tenant considerations⁴⁷	↑ # tenants	2	+	++	+++
	↑ DB size/tenant	2	+++	++	+
	↑ # users/tenant	3	+++	++	+
	Value-added services/tenant	2	+++	++	+

TABLE 17: COMPARISON BETWEEN VARIOUS DATA-ARCHITECTURES

During the evaluation of the tenant considerations, we ranked them as being less important than the costs and security aspects. This due to the fact that according to the technical developers, the SinYate platform can be easily extended (e.g. scaling up measures) in order to support increasing number of tenants, the growing database requirements per tenant, etc.. Consequently, making tradeoff between the economical considerations and the customers' requirements concerning the isolation of the corporate data, the **isolated schemes** approach seems to be most suitable. On the one side, this option allows to separate the data by attributing each customer to a personal isolated scheme and thus meet the customer requirements. And on the other side by storing all those schemes in a common database, SinYate can lower the operational costs, achieving economies of scale.

6.2.4. Authentication System

Previously in this chapter we have mentioned that the log-in function is implemented using the Log4J logging utility (supra, p. 94) not yet elaborating on the authentication system in general. Consequently, in this part we are considering what kind of authentication system – centralized or decentralized – would be most suitable for the SinYate testing platform.

As explained in chapter 2, the main difference between the centralized and decentralized approaches lies in the fact that the latter incorporates the deployment of the federation server which allows the provision of the single sign-on (SSO) option to the customers (supra, p. 31).

⁴⁵ Criticality indicates the grade of importance of the particular consideration for SinYate ranging from 1 (most important) to 3 (less important)

⁴⁶ Greater number of “+” signs refers to the higher costs

⁴⁷ Greater number of “+” signs indicates better suitability of the approach to meet the associated requirement

Therefore, the choice of the appropriate authentication system depends on whether the potential customers give high priority to the SSO experience and are ready to carry extra costs associated with the installation of the federation server within the corporate network.

Seen that SinYate first of all targets the mobile web developers and transcoders all over the world, it seems rather unfeasible and cost ineffective to deploy the decentralized authentication system. In addition, the chance that those potential customers would request the SSO is negligible, due to the necessary investment in the installation of the federation server. As a consequence, the **centralized approach**, which implies the use of the central user account database serving all application clients and does not involve any changes to the customers' infrastructure, would be the best solution to safeguard the decent authentication processing. What is more, in case some customers explicitly demand the SSO option and are ready to carry the costs of the federation server, it is feasible to combine both authentication approaches.

6.3. Finance

“70% of SaaS Companies Will Not Exist in Twelve Months’ Time.” (Ubikwiti™, 2009)

This pessimistic comment was given during a panel discussion at OpSource SaaS Summit in San Francisco in early March 2009. The reason behind such enormous failure rate lies in the inability of many SaaS companies to balance their burn rate with revenues and profits, especially in the period of economical crisis. That is why it is of great importance for SinYate to assess in advance as realistic as possible the firm's profitability potential, by identifying all possible **revenue streams** and all the **costs**, associated with the development and the delivery of the service.

6.3.1. Cost Structure

Staying consistent with our cost analysis in chapter 2 (supra, p. 34), during the evaluation of the SinYate's cost structure we make a distinction between two big cost categories, namely the major **investments** in the underlying infrastructure and required assets and the monthly **recurring costs**, associated with the management of the processes, development and delivery of the services.

Seen that the core process of SinYate is represented by the technical development of the testing services, the major investments concern the deployment of the required infrastructure and

acquirement of assets such as computers and software to be used by the engineers in the development process.

	Year 1	Year 3	Year 5
Infrastructure	30 000	50 000	-
Computers	6 000	16 000	20 000
Software	20 000	-	-
TOTAL	56 000	66 000	20 000

TABLE 18: MAJOR SINYATE INVESTMENTS (IN €)

TABLE 18 gives an overview of all the major investments inclusive the required amount and the period of the actual acquisition of extra resources and the extension of the underlying infrastructure, which is in line with the growing number of customers and international expansion.

Next to the periodical investments, the activities of SinYate incorporate monthly recurring costs, related to the SinYate's key activities, namely the technical development and the delivery of the testing platform to the customers. Consequently, the remuneration of the personnel, which mainly consists of the software engineers, sales force and the operations staff, represents the major portion in the cost structure of the start-up (see FIGURE 41). Furthermore, SinYate must foresee considerable marketing funds in order to realize the ambition of reaching the international customers and becoming a worldwide player. Finally, with regard to the SaaS nature of the SinYate's offering, infrastructure and operational expenses, needed to maintain and ensure the continuous availability of the testing service, represent the third considerable portion in the overall SinYate cost structure.

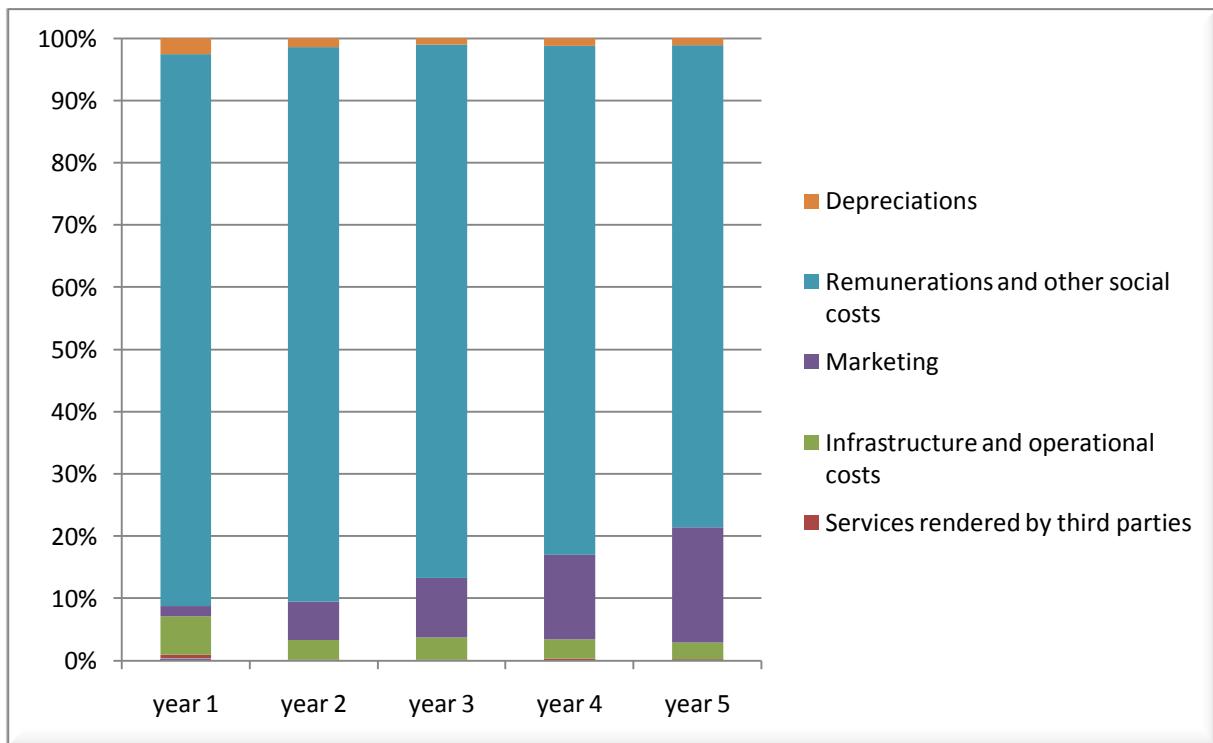


FIGURE 41: SINYATE COST STRUCTURE

6.3.2. Revenue Streams

According to the findings of 16 Ventures and as already worked out previously, the SaaS business model provides the opportunity to generate revenues in seven various ways (supra, p. 40). In this part we make an attempt to evaluate the revenue potential of SinYate and identify which of those seven revenue streams (see FIGURE 42) are applicable to SinYate.

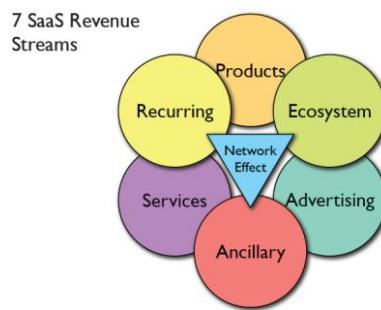


FIGURE 42: SAAS POSSIBLE REVENUE STREAMS (SaaS Revenue Modelling, 2010)

The first and the major portion of income, classified as *recurring revenue stream*, evidently originates from the testing services, offered in the form of three different **service packs**, namely productivity pack, development pack and individual tests (supra, p. 85). The first two packs are

obtainable under the **subscription base**, while the individual tests are priced following the **usage-based** principle (supra, p. 89). Furthermore, the customers have the possibility to extend the standard service pack with some extra features and options (e.g. extra devices, extra runs) against the additional fee.

As mentioned earlier in this chapter (supra, p. 88), SinYate intends to provide some extra *services* such as **training** and **consulting** if demanded by the customers, benefiting in such a way from an additional source of revenues. The training incorporates the guidance on the metrics and composition of the required test campaigns, while the consulting services include the advices on the choice or composition of the most appropriate service pack, dependent on the testing frequency, required metrics, reporting and number of mobile devices.

There also exists the possibility to use the partners and other parties in the SinYate *ecosystem* as another potential source of revenues by for example combining the related services in order to compose the **all-in service pack** for mutual customers (e.g. Siruna's mobilization service and SinYate's testing service). Additionally, all the parties in the ecosystem can be involved in the common **affiliate program** on the commission base.

Finally, SinYate can fully exploit the possibility of gathering the statistical information, offered by the developed platform, in order to generate aggregated **data reports** which can be traded to the players in SinYate *value network*. As an example, the mobile web transcoders or mobile web developers can use the information on the most frequently occurring bugs and errors in order to improve the transcoding or developing process, in such a way positively influencing the customer satisfaction.

The other three revenue streams, namely the *advertising, ancillary* and *product revenues* are in our opinion not applicable for SinYate due to several reasons. First of all, advertisement does not belong to the SinYate's core business such that the chance to generate considerable revenues from the advertisements, especially for a start-up company, retains very small. Secondly, the SinYate testing platform does not require any operational changes on the customer's system and can be easily accessed via the internet, eliminating the possible product and ancillary revenue streams.

7. Conclusion

Through thorough analysis of SaaS Business Model presented in this master dissertation, we can clearly conclude that SaaS is not a fairy tale with the happy end for everyone. This Business Model has its specific advantages and disadvantages, depending on the role in the SaaS ecosystem, which influences the decision to offer and to implement the services based on SaaS business model.

It is likeable to foster the SaaS business model from the customer point of view because of the following factors. The first and the determinant issue is the question whether the considered application makes a part of the company's core activity. If this is not the case, the application can be outsourced and consumed as a service; resulting in the cost savings for the customer, thanks to the substitution of capital expenditures by the operational expenditures through extensive outsourcing of the IT infrastructure and other costs, associated with the installation, exploitation and maintenance of the on-premise software. Secondly, the total cost of ownership for SaaS compared to the on-premise software is much lower for the Small and Medium sized Enterprises, what results in a higher adoption rate of SaaS by companies with limited number of users. Because of the pay-per-use the customer avoids the overcapacity and over budgeting. Furthermore, the client benefits from the 24/7 support and maintenance.

However, the customer may still fear for the security of the data storage. Moreover, there exists a risk of downtime and in case of the provider's bankruptcy, some difficulties with data ownership and transmission may occur.

The other party, namely the service provider, faces different factors, which influence the evaluation of offering the Software as a Service. Firstly, SaaS business model gives the possibility to create the economies of scale through servicing multiple customers with the same infrastructure. At the second place, we think of hitting-the-long tail effect, such that even the smallest customers can afford otherwise expensive software. And finally, the supplier has the advantage of collecting the short term cash on a constant base.

Contrarily, the major obstacles for a provider are the costs associated with the initial investment in the infrastructure, security and the creation of installed base. Furthermore, not being on compliance with some aspects of the service level agreement may lead to penalty payments and eventually customer loss.

Taking into account the current development on the market of cloud computing, we have clearly seen that potential users are still unaware of the benefits of SaaS Business Model and still have some doubts for implementation of SaaS. This leads to the fact that the providers have to push and educate the customers such that they are convinced about the security of the model. From the moment that the customer is released from the prejudice of “unsecure SaaS” model, we believe that the demand will be pulled by the customer. This scenario promises a high adoption of SaaS in the business world and potentially announcement of a new era for cloud computing. And we truthfully believe that business-to-business segment is the first to be conquered, eventually followed by the business-to-consumer segment.

The die-hards of SaaS truly see this business model as the revolutionary one, which will fully replace the traditional on-premise software. However, not all kinds of applications can be put in the cloud which implies that this transition is surely not for the near future.

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Appendices

APPENDIX 2.1: FINANCIAL POSITION OF QUOTED SAAS COMPANIES

FINANCIALS: NETSUITE INC. (N.N)⁴⁸

Revenue

Periods	2007	2008	2009
March	23.229	34.118	41.567
June	25.513	36.553	40.304
September	28.065	40.404	41.705
December	31.734	41.401	42.964
Totals	108.541	152.476	166.54

Note: Units in Millions of U.S. Dollars

Earnings Per Share

Periods	2007	2008	2009
March	-1.23776	-0.03376	-0.06114
June	-1.21635	-0.05199	-0.08068
September	-0.21339	-0.10328	-0.12929
December	-0.21527	-0.07339	-0.10456
Totals	-2.44588	-0.26271	-0.37623

Note: Units in U.S. Dollars

Consensus Estimates Analysis

SALES (in millions)

Quarter Ending Mar-10	15	43.73	45.31	42.60	50.73
Quarter Ending Jun-10	15	44.97	46.75	44.00	52.60
Year Ending Dec-10	16	184.10	189.85	182.00	208.23

⁴⁸<<http://www.reuters.com/finance/stocks/financialHighlights?symbol=N.N>> (15.03.2010)

Year Ending Dec-11 11 214.21 231.74 205.00 240.00

EARNINGS (per share)

Quarter Ending Mar-10	16	0.01	0.02	0.01	0.03
Quarter Ending Jun-10	16	0.01	0.03	0.00	0.03
Year Ending Dec-10	16	0.08	0.14	0.06	0.14
Year Ending Dec-11	12	0.17	0.26	-0.03	0.28
LT Growth Rate (%)	5	26.00	35.00	15.00	24.17

Sales and Earnings Figures in U.S. Dollars (USD)

Valuation Ratios

	Company	Industry	Sector	S&P 500
P/E Ratio (TTM)	--	205.11	10.18	16.71
P/E High - Last 5 Yrs.	NA	1.77	0.43	20.13
P/E Low - Last 5 Yrs.	NA	0.52	0.10	5.04
Beta	--	0.67	1.16	1.36
Price to Sales (TTM)	5.27	0.27	0.44	2.21
Price to Book (MRQ)	8.36	1.71	1.34	3.14
Price to Tangible Book (MRQ)	14.70	2.83	2.39	5.91
Price to Cash Flow (TTM)	--	2.54	6.29	23.28
Price to Free Cash Flow (TTM)	--	18.92	18.89	21.00
% Owned Institutions	--	--	--	--

Dividends

	Company	Industry	Sector	S&P 500
Dividend Yield	NA	0.09	0.05	1.50
Dividend Yield - 5 Year Avg.	--	1.43	1.31	2.58

Dividend 5 Year Growth Rate	--	9.31	14.53	-9.32
Payout Ratio(TTM)	--	13.59	6.90	29.14
Growth Rates	Company	Industry	Sector	S&P 500
Sales (MRQ) vs Qtr. 1 Yr. Ago	3.78	-3.31	-7.45	12.74
Sales (TTM) vs TTM 1 Yr. Ago	9.22	-0.29	-6.76	-2.75
Sales - 5 Yr. Growth Rate	56.60	6.13	6.89	6.74
EPS (MRQ) vs Qtr. 1 Yr. Ago	-42.47	499.05	152.49	197.23
EPS (TTM) vs TTM 1 Yr. Ago	-43.16	--	--	--
EPS - 5 Yr. Growth Rate	--	-1.00	10.89	8.26
Capital Spending - 5 Yr. Growth Rate	24.67	3.72	13.85	9.58
Financial Strength	Company	Industry	Sector	S&P 500
Quick Ratio (MRQ)	1.55	2.31	1.47	0.83
Current Ratio (MRQ)	1.55	2.64	1.83	0.98
LT Debt to Equity (MRQ)	--	25.94	65.07	142.02
Total Debt to Equity (MRQ)	--	49.50	92.12	202.74
Interest Coverage (TTM)	--	0.56	0.28	11.00
Profitability Ratios	Company	Industry	Sector	S&P 500
Gross Margin (TTM)	66.31	6.69	8.30	30.29
Gross Margin - 5 Yr. Avg.	66.66	31.69	21.65	27.24
EBITD Margin (TTM)	-7.68	--	--	--
EBITD - 5 Yr. Avg	-24.58	13.68	11.49	14.92

Operating Margin (TTM)	-14.12	1.82	1.14	--
Operating Margin - 5 Yr. Avg.	-29.63	8.97	7.47	17.17
Pre-Tax Margin (TTM)	-14.09	1.83	1.19	12.92
Pre-Tax Margin - 5 Yr. Avg.	-29.44	9.81	7.80	16.82
Net Profit Margin (TTM)	-14.48	1.26	0.98	10.40
Net Profit Margin - 5 Yr. Avg.	-29.98	5.68	5.02	12.30
Effective Tax Rate (TTM)	--	6.03	7.57	11.78
Effecitve Tax Rate - 5 Yr. Avg.	--	38.78	39.06	26.01
Efficiency	Company	Industry	Sector	S&P 500
Revenue/Employee (TTM)	--	1,529,076	14,071,560	561,111
Net Income/Employee (TTM)	--	13,979	115,280	62,047
Receivable Turnover (TTM)	6.35	1.23	1.39	8.21
Inventory Turnover (TTM)	--	2.74	1.79	6.20
Asset Turnover (TTM)	0.81	0.25	0.23	0.49
Management Effectiveness	Company	Industry	Sector	S&P 500
Return on Assets (TTM)	-11.69	1.03	0.33	5.07
Return on Assets - 5 Yr. Avg.	--	4.50	3.62	5.42
Return on Investment (TTM)	-20.77	1.91	0.57	6.64
Return on Investment - 5 Yr. Avg.	--	7.10	5.82	6.97
Return on Equity (TTM)	-21.80	0.83	1.31	14.72
Return on Equity - 5 Yr. Avg.				

FINANCIALS: SALESFORCE.COM, INC. (CRM.N)⁴⁹

Revenue

Periods	2008	2009	2010
April	162.412	247.622	304.924
July	176.579	263.077	316.061
October	192.803	276.487	330.549
January	216.906	289.583	354.049
Totals	748.7	1076.77	1305.58

Note: Units in Millions of U.S. Dollars

EARNINGS PER SHARE

Periods	2008	2009	2010
April	0.00605	0.0768	0.14708
July	0.03078	0.07957	0.16749
October	0.0533	0.08091	0.1609
January	0.05966	0.11044	0.15605
Totals	0.14994	0.34679	0.63006

Note: Units in U.S. Dollars

CONSENSUS ESTIMATES ANALYSIS

	# of Estimates	Mean	High	Low	1 Year Ago
SALES (in millions)					
Quarter Ending apr-10	29	367.09	374.86	356.99	371.86
Quarter Ending jul-10	29	374.89	385.94	367.60	385.41
Year Ending jan-10	29	1,293.81	1,297.84	1,292.35	--
Year Ending jan-11	30	1,536.76	1,580.44	1,500.32	1,568.05
Year Ending jan-12	26	1,812.02	1,919.06	1,709.07	1,708.98

⁴⁹ <<http://www.reuters.com/finance/stocks/financialHighlights?symbol=CRM.N>>(15.03.2010)

EARNINGS (per share)

Quarter Ending apr-10	29	0.18	0.31	0.12	0.29
Quarter Ending jul-10	29	0.19	0.33	0.13	0.30
Year Ending jan-10	30	0.63	0.65	0.61	--
Year Ending jan-11	30	0.82	1.31	0.55	1.27
Year Ending jan-12	26	1.10	1.94	0.82	1.53
LT Growth Rate (%)	12	30.75	40.00	15.00	37.45

Sales and Earnings Figures in U.S. Dollars (USD)

VALUATION RATIOS

	Company	Industry	Sector	S&P 500
P/E Ratio (TTM)	118.93	20.31	9.46	16.71
P/E High - Last 5 Yrs.	NA	7.73	2.48	20.13
P/E Low - Last 5 Yrs.	NA	2.42	0.51	5.04
Beta	1.99	0.78	1.22	1.36
Price to Sales (TTM)	7.38	1.43	0.64	2.21
Price to Book (MRQ)	9.22	3.87	1.93	3.14
Price to Tangible Book (MRQ)	10.10	11.53	2.66	5.91
Price to Cash Flow (TTM)	65.22	6.83	5.21	23.28
Price to Free Cash Flow (TTM)	44.38	41.96	15.28	21.00
% Owned Institutions	--	--	--	--

DIVIDENDS

	Company	Industry	Sector	S&P 500
Dividend Yield	NA	0.28	0.05	1.50
Dividend Yield - 5 Year Avg.	0.00	2.11	1.05	2.58

Dividend 5 Year Growth Rate	--	7.99	8.63	-9.32
Payout Ratio(TTM)	0.00	43.68	18.98	29.14
GROWTH RATES	Company	Industry	Sector	S&P 500
Sales (MRQ) vs Qtr. 1 Yr. Ago	22.26	-2.77	1.98	12.74
Sales (TTM) vs TTM 1 Yr. Ago	21.25	-3.18	-3.48	-2.75
Sales - 5 Yr. Growth Rate	49.24	8.48	9.17	6.74
EPS (MRQ) vs Qtr. 1 Yr. Ago	41.30	-2.56	182.59	197.23
EPS (TTM) vs TTM 1 Yr. Ago	83.93	--	--	--
EPS - 5 Yr. Growth Rate	56.90	2.41	-0.55	8.26
Capital Spending - 5 Yr. Growth Rate	65.75	33.88	15.41	9.58
FINANCIAL STRENGTH	Company	Industry	Sector	S&P 500
Quick Ratio (MRQ)	1.88	2.20	1.47	0.83
Current Ratio (MRQ)	1.88	2.34	1.74	0.98
LT Debt to Equity (MRQ)	43.13	13.61	27.56	142.02
Total Debt to Equity (MRQ)	43.13	18.78	43.42	202.74
Interest Coverage (TTM)	--	1.47	-0.11	11.00
PROFITABILITY RATIOS	Company	Industry	Sector	S&P 500
Gross Margin (TTM)	80.24	26.58	11.61	30.29
Gross Margin - 5 Yr. Avg.	78.72	58.59	34.17	27.24
EBITD Margin (TTM)	13.65	--	--	--
EBITD - 5 Yr. Avg	8.71	26.24	22.19	14.92

	Company	Industry	Sector	S&P 500
Operating Margin (TTM)	8.83	8.47	0.43	--
Operating Margin - 5 Yr. Avg.	5.48	22.48	11.36	17.17
Pre-Tax Margin (TTM)	10.91	8.36	0.29	12.92
Pre-Tax Margin - 5 Yr. Avg.	8.00	23.44	9.10	16.82
Net Profit Margin (TTM)	6.49	6.03	-1.03	10.40
Net Profit Margin - 5 Yr. Avg.	4.77	14.76	6.22	12.30
Effective Tax Rate (TTM)	40.52	13.21	36.29	11.78
Effecitve Tax Rate - 5 Yr. Avg.	40.37	32.52	21.06	26.01
EFFICIENCY	Company	Industry	Sector	S&P 500
Revenue/Employee (TTM)	328,862	9,483,183	3,598,737	561,111
Net Income/Employee (TTM)	21,333	255,865	-214,286	62,047
Receivable Turnover (TTM)	4.44	3.01	2.15	8.21
Inventory Turnover (TTM)	--	3.71	2.82	6.20
Asset Turnover (TTM)	0.66	0.36	0.37	0.49
MANAGEMENT EFFECTIVENESS	Company	Industry	Sector	S&P 500
Return on Assets (TTM)	4.30	4.35	0.83	5.07
Return on Assets - 5 Yr. Avg.	3.73	11.18	5.63	5.42
Return on Investment (TTM)	7.56	6.22	1.38	6.64
Return on Investment - 5 Yr. Avg.	7.50	16.38	8.38	6.97
Return on Equity (TTM)	9.41	8.03	1.11	14.72
Return on Equity - 5 Yr. Avg.	7.81	18.37	9.54	9.94

FINANCIALS: RIGHTNOW TECHNOLOGIES INC (RNOW.OQ)⁵⁰

Periods	2007	2008	2009
March	25.702	32.898	36.037
June	26.465	35.221	36.34
September	29.246	36.237	38.731
December	30.664	36.079	41.579
Totals	112.077	140.435	152.687

Note: Units in Millions of U.S. Dollars

EARNINGS PER SHARE

Periods	2007	2008	2009
March	-0.18266	-0.10128	0.03916
June	-0.17406	-0.09326	0.00112
September	-0.1083	-0.04301	0.0606
December	-0.09931	0.02084	0.07889
Totals	-0.56355	-0.2183	0.18156

Note: Units in U.S. Dollars

CONSENSUS ESTIMATES ANALYSIS

	# of Estimates	Mean	High	Low	1 Year Ago
SALES (in millions)					
Quarter Ending mrt-10	16	42.37	42.54	42.00	40.97
Quarter Ending jun-10	16	43.32	44.00	41.73	42.37
Year Ending dec-10	17	177.97	179.59	176.50	170.16
Year Ending dec-11	14	203.44	211.89	196.75	192.65

⁵⁰ < <http://www.reuters.com/finance/stocks/financialHighlights?symbol=RNOW.OQ> > (15.03.2010)

EARNINGS (per share)

Quarter Ending mrt-10	18	0.08	0.09	0.02	0.06
Quarter Ending jun-10	17	0.09	0.12	0.03	0.07
Year Ending dec-10	18	0.42	0.46	0.20	0.29
Year Ending dec-11	15	0.68	0.85	0.57	0.45
LT Growth Rate (%)	7	28.71	45.00	15.00	28.20

Sales and Earnings Figures in U.S. Dollars (USD)

VALUATION RATIOS	Company	Industry	Sector	S&P 500
P/E Ratio (TTM)	96.35	2.66	9.46	16.71
P/E High - Last 5 Yrs.	NA	3.85	2.48	20.13
P/E Low - Last 5 Yrs.	NA	0.71	0.51	5.04
Beta	1.03	1.09	1.22	1.36
Price to Sales (TTM)	3.62	0.54	0.64	2.21
Price to Book (MRQ)	13.72	3.47	1.93	3.14
Price to Tangible Book (MRQ)	19.01	4.29	2.66	5.91
Price to Cash Flow (TTM)	41.40	1.76	5.21	23.28
Price to Free Cash Flow (TTM)	140.18	17.25	15.28	21.00
% Owned Institutions	--	--	--	--
DIVIDENDS	Company	Industry	Sector	S&P 500
Dividend Yield	NA	0.05	0.05	1.50
Dividend Yield - 5 Year Avg.	0.00	0.83	1.05	2.58
Dividend 5 Year Growth Rate	--	15.08	8.63	-9.32

Payout Ratio(TTM)	0.00	0.97	18.98	29.14
GROWTH RATES	Company	Industry	Sector	S&P 500
Sales (MRQ) vs Qtr. 1 Yr. Ago	15.24	7.94	1.98	12.74
Sales (TTM) vs TTM 1 Yr. Ago	8.72	0.14	-3.48	-2.75
Sales - 5 Yr. Growth Rate	19.84	10.57	9.17	6.74
EPS (MRQ) vs Qtr. 1 Yr. Ago	278.55	56.79	182.59	197.23
EPS (TTM) vs TTM 1 Yr. Ago	182.95	--	--	--
EPS - 5 Yr. Growth Rate	9.01	11.46	-0.55	8.26
Capital Spending - 5 Yr. Growth Rate	7.89	8.30	15.41	9.58
FINANCIAL STRENGTH	Company	Industry	Sector	S&P 500
Quick Ratio (MRQ)	1.42	1.84	1.47	0.83
Current Ratio (MRQ)	1.42	2.01	1.74	0.98
LT Debt to Equity (MRQ)	0.00	33.97	27.56	142.02
Total Debt to Equity (MRQ)	0.05	58.98	43.42	202.74
Interest Coverage (TTM)	--	-0.99	-0.11	11.00
PROFITABILITY RATIOS				
	Company	Industry	Sector	S&P 500
Gross Margin (TTM)	68.85	4.74	11.61	30.29
Gross Margin - 5 Yr. Avg.	68.10	40.98	34.17	27.24
EBITD Margin (TTM)	7.76	--	--	--
EBITD - 5 Yr. Avg	0.49	18.66	22.19	14.92

	Company	Industry	Sector	S&P 500
Operating Margin (TTM)	2.85	0.98	0.43	--
Operating Margin - 5 Yr. Avg.	-4.75	13.33	11.36	17.17
Pre-Tax Margin (TTM)	4.22	1.03	0.29	12.92
Pre-Tax Margin - 5 Yr. Avg.	-2.57	13.85	9.10	16.82
Net Profit Margin (TTM)	3.85	0.56	-1.03	10.40
Net Profit Margin - 5 Yr. Avg.	-2.88	7.92	6.22	12.30
Effective Tax Rate (TTM)	8.98	2.16	36.29	11.78
Effecitve Tax Rate - 5 Yr. Avg.	--	66.58	21.06	26.01
EFFICIENCY	Company	Industry	Sector	S&P 500
Revenue/Employee (TTM)	190,859	501,342	3,598,737	561,111
Net Income/Employee (TTM)	7,339	51,959	-214,286	62,047
Receivable Turnover (TTM)	4.74	0.63	2.15	8.21
Inventory Turnover (TTM)	--	1.64	2.82	6.20
Asset Turnover (TTM)	0.93	0.08	0.37	0.49
MANAGEMENT EFFECTIVENESS	Company	Industry	Sector	S&P 500
Return on Assets (TTM)	3.59	1.03	0.83	5.07
Return on Assets - 5 Yr. Avg.	-2.27	7.12	5.63	5.42
Return on Investment (TTM)	9.04	1.33	1.38	6.64
Return on Investment - 5 Yr. Avg.	-4.92	9.81	8.38	6.97
Return on Equity (TTM)	17.41	2.93	1.11	14.72
Return on Equity - 5 Yr. Avg.	-8.99	11.62	9.54	9.94

FINANCIALS: CHINA.COM INC. (8006.HK)⁵¹

	Company	Industry	Sector	S&P 500
P/E Ratio (TTM)	--	2.66	9.46	16.71
P/E High - Last 5 Yrs.	--	3.85	2.48	20.13
P/E Low - Last 5 Yrs.	--	0.71	0.51	5.04
Beta	0.99	1.09	1.22	1.36
Price to Sales (TTM)	5.12	0.54	0.64	2.21
Price to Book (MRQ)	--	3.47	1.93	3.14
Price to Tangible Book (MRQ)	--	4.29	2.66	5.91
Price to Cash Flow (TTM)	--	1.76	5.21	23.28
Price to Free Cash Flow (TTM)	--	17.25	15.28	21.00
% Owned Institutions	--	--	--	--
DIVIDENDS	Company	Industry	Sector	S&P 500
Dividend Yield	--	0.05	0.05	1.50
Dividend Yield - 5 Year Avg.	0.00	0.83	1.05	2.58
Dividend 5 Year Growth Rate	--	15.08	8.63	-9.32
Payout Ratio(TTM)	--	0.97	18.98	29.14
GROWTH RATES	Company	Industry	Sector	S&P 500
Sales (MRQ) vs Qtr. 1 Yr. Ago	-6.98	7.94	1.98	12.74
Sales (TTM) vs TTM 1 Yr. Ago	-14.15	0.14	-3.48	-2.75

⁵¹ <<http://www.reuters.com/finance/stocks/financialHighlights?symbol=8006.HK>> (15.03.2010)

Sales - 5 Yr. Growth Rate	-9.14	10.57	9.17	6.74
EPS (MRQ) vs Qtr. 1 Yr. Ago	-368.30	56.79	182.59	197.23
EPS (TTM) vs TTM 1 Yr. Ago	89.29	--	--	--
EPS - 5 Yr. Growth Rate	--	11.46	-0.55	8.26
Capital Spending - 5 Yr. Growth Rate	-16.52	8.30	15.41	9.58
FINANCIAL STRENGTH	Company	Industry	Sector	S&P 500
Quick Ratio (MRQ)	--	1.84	1.47	0.83
Current Ratio (MRQ)	--	2.01	1.74	0.98
LT Debt to Equity (MRQ)	--	33.97	27.56	142.02
Total Debt to Equity (MRQ)	--	58.98	43.42	202.74
Interest Coverage (TTM)	--	-0.99	-0.11	11.00
PROFITABILITY RATIOS	Company	Industry	Sector	S&P 500
Gross Margin (TTM)	55.28	4.74	11.61	30.29
Gross Margin - 5 Yr. Avg.	60.20	40.98	34.17	27.24
EBITD Margin (TTM)	--	--	--	--
EBITD - 5 Yr. Avg	-39.34	18.66	22.19	14.92
Operating Margin (TTM)	-52.54	0.98	0.43	--
Operating Margin - 5 Yr. Avg.	-47.47	13.33	11.36	17.17
Pre-Tax Margin (TTM)	-52.52	1.03	0.29	12.92
Pre-Tax Margin - 5 Yr. Avg.	-48.56	13.85	9.10	16.82

Net Profit Margin (TTM)	-55.06	0.56	-1.03	10.40
Net Profit Margin - 5 Yr. Avg.	-49.91	7.92	6.22	12.30
Effective Tax Rate (TTM)	--	2.16	36.29	11.78
Effecitve Tax Rate - 5 Yr. Avg.	--	66.58	21.06	26.01

EFFICIENCY	Company	Industry	Sector	S&P 500
Revenue/Employee (TTM)	437,022	501,342	3,598,737	561,111
Net Income/Employee (TTM)	-240,609	51,959	-214,286	62,047
Receivable Turnover (TTM)	--	0.63	2.15	8.21
Inventory Turnover (TTM)	--	1.64	2.82	6.20
Asset Turnover (TTM)	--	0.08	0.37	0.49
MANAGEMENT EFFECTIVENESS	Company	Industry	Sector	S&P 500
Return on Assets (TTM)	--	1.03	0.83	5.07
Return on Assets - 5 Yr. Avg.	-6.19	7.12	5.63	5.42
Return on Investment (TTM)	--	1.33	1.38	6.64
Return on Investment - 5 Yr. Avg.	-6.92	9.81	8.38	6.97
Return on Equity (TTM)	--	2.93	1.11	14.72
Return on Equity - 5 Yr. Avg.	-6.64	11.62	9.54	9.94

FINANCIALS: EPICOR SOFTWARE CORPORATION (EPIC.OQ)⁵²

Periods	2007	2008	2009
September	101.329	102.224	98.693
December	105.706	127.945	100.447
March	103.1	135.762	98.576
June	119.697	121.948	111.908
Totals	429.832	487.879	409.624

Note: Units in Millions of U.S. Dollars

EARNINGS PER SHARE

Periods	2007	2008	2009
September	0.07682	-0.13861	-0.0276
December	0.10869	0.00474	-0.1123
March	0.13917	0.04643	0.0059
June	0.38365	0.02618	0.11314
Totals	0.71164	-0.05914	-0.02139

Note: Units in U.S. Dollars

CONSENSUS ESTIMATES ANALYSIS

	# of Estimates	Mean	High	Low	1 Year Ago
SALES (in millions)					
Quarter Ending mrt-10	7	99.51	100.51	99.00	106.78
Quarter Ending jun-10	7	105.43	106.58	102.99	117.35
Year Ending dec-10	7	425.07	431.00	415.64	474.61
Year Ending dec-11	5	449.45	467.30	436.08	525.00

⁵² <<http://www.reuters.com/finance/stocks/financialHighlights?symbol=EPIC.OQ>> (15.03.2010)

EARNINGS (per share)

Quarter Ending mrt-10	7	0.10	0.11	0.10	0.11
Quarter Ending jun-10	7	0.13	0.14	0.12	0.15
Year Ending dec-10	7	0.55	0.58	0.50	0.64
Year Ending dec-11	5	0.64	0.69	0.59	--

Sales and Earnings Figures in U.S. Dollars (USD)

VALUATION RATIOS

	Company	Industry	Sector	S&P 500
P/E Ratio (TTM)	--	20.31	9.46	16.71
P/E High - Last 5 Yrs.	NA	7.73	2.48	20.13
P/E Low - Last 5 Yrs.	NA	2.42	0.51	5.04
Beta	1.78	0.78	1.22	1.36
Price to Sales (TTM)	1.44	1.43	0.64	2.21
Price to Book (MRQ)	1.97	3.87	1.93	3.14
Price to Tangible Book (MRQ)	--	11.53	2.66	5.91
Price to Cash Flow (TTM)	15.75	6.83	5.21	23.28
Price to Free Cash Flow (TTM)	--	41.96	15.28	21.00

% Owned Institutions

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DIVIDENDS

	Company	Industry	Sector	S&P 500
Dividend Yield	NA	0.28	0.05	1.50
Dividend Yield - 5 Year Avg.	--	2.11	1.05	2.58
Dividend 5 Year Growth Rate	--	7.99	8.63	-9.32
Payout Ratio(TTM)	--	43.68	18.98	29.14

GROWTH RATES	Company	Industry	Sector	S&P 500
Sales (MRQ) vs Qtr. 1 Yr. Ago	-8.23	-2.77	1.98	12.74
Sales (TTM) vs TTM 1 Yr. Ago	-16.04	-3.18	-3.48	-2.75
Sales - 5 Yr. Growth Rate	12.74	8.48	9.17	6.74
EPS (MRQ) vs Qtr. 1 Yr. Ago	332.16	-2.56	182.59	197.23
EPS (TTM) vs TTM 1 Yr. Ago	65.95	--	--	--
EPS - 5 Yr. Growth Rate	--	2.41	-0.55	8.26
Capital Spending - 5 Yr. Growth Rate	--	33.88	15.41	9.58
FINANCIAL STRENGTH	Company	Industry	Sector	S&P 500
Quick Ratio (MRQ)	1.40	2.20	1.47	0.83
Current Ratio (MRQ)	1.41	2.34	1.74	0.98
LT Debt to Equity (MRQ)	85.15	13.61	27.56	142.02
Total Debt to Equity (MRQ)	85.22	18.78	43.42	202.74
Interest Coverage (TTM)	0.81	1.47	-0.11	11.00
PROFITABILITY RATIOS	Company	Industry	Sector	S&P 500
Gross Margin (TTM)	45.76	26.58	11.61	30.29
Gross Margin - 5 Yr. Avg.	50.42	58.59	34.17	27.24
EBITD Margin (TTM)	13.69	--	--	--
EBITD - 5 Yr. Avg	15.03	26.24	22.19	14.92
Operating Margin (TTM)	4.24	8.47	0.43	--
Operating Margin - 5 Yr. Avg.	7.92	22.48	11.36	17.17

	Company	Industry	Sector	S&P 500
Pre-Tax Margin (TTM)	-1.12	8.36	0.29	12.92
Pre-Tax Margin - 5 Yr. Avg.	5.32	23.44	9.10	16.82
Net Profit Margin (TTM)	-0.30	6.03	-1.03	10.40
Net Profit Margin - 5 Yr. Avg.	5.62	14.76	6.22	12.30
Effective Tax Rate (TTM)	--	13.21	36.29	11.78
Effecitve Tax Rate - 5 Yr. Avg.	-5.71	32.52	21.06	26.01
EFFICIENCY	Company	Industry	Sector	S&P 500
Revenue/Employee (TTM)	--	9,483,183	3,598,737	561,111
Net Income/Employee (TTM)	--	255,865	-214,286	62,047
Receivable Turnover (TTM)	4.31	3.01	2.15	8.21
Inventory Turnover (TTM)	61.37	3.71	2.82	6.20
Asset Turnover (TTM)	0.55	0.36	0.37	0.49
MANAGEMENT EFFECTIVENESS	Company	Industry	Sector	S&P 500
Return on Assets (TTM)	-0.17	4.35	0.83	5.07
Return on Assets - 5 Yr. Avg.	4.07	11.18	5.63	5.42
Return on Investment (TTM)	-0.21	6.22	1.38	6.64
Return on Investment - 5 Yr. Avg.	5.47	16.38	8.38	6.97
Return on Equity (TTM)	-0.42	8.03	1.11	14.72
Return on Equity - 5 Yr. Avg.	9.90	18.37	9.54	9.94

APPENDIX 3.1: 12 IAAS PROVIDERS (Source: Conry-Murray, 2009)

Company/ Service Name	URL	Typical Use Cases	Hypervisor Platforms	OS Support
Amazon.com Elastic Compute Cloud	www.amazon.com/ec2	Web hosting, transactional Web apps, computing on demand	Xen	Windows Server, Red Hat, OpenSolaris, Fedora, OpenSUSE, Debian, Ubuntu, Gentoo
AT&T AT&T Synaptic Hosting	http://www.business.att.com/enterprise/Family/application-hosting-enterprise/synaptic-hosting-enterprise/	Web hosting, test and development, transactional Web apps	VMware	Windows, Red Hat
GNI GNI Dedicated Hosting	www.gni.com	Web hosting, SaaS, test and development, computing on demand	VMware, Xen, Microsoft Virtual Server	Windows, Red Hat, CentOS, Debian, Gentoo, Ubuntu
IBM Computing On Demand	www.ibm.com/systems/deepcomputing/cod/index.html	High-intensity computing on demand, testing and development	VMware, Xen	Windows Server, Red Hat, CentOS, SUSE, AIX
Rackspace Cloud Servers	www.rackspacecloud.com	Web hosting, transactional Web apps, computing on demand	Xen	Red Hat, Fedora, CentOS, Debian, Ubuntu, Arch, Gentoo
Savvis Savvis Open Cloud Compute	www.savvis.com	Web hosting, SaaS, testing and development, computing on demand	VMware	Windows Server, Red Hat, Sun Solaris 10 and x86
ServePath GoGrid	www.gogrid.com	Web app hosting, testing and development, computing on demand, disaster recovery	Xen	Windows Server, CentOS, Red Hat
Skytap Skytap Virtual Lab	www.skytap.com	Testing, quality assurance, development, IT prototyping	VMware, Xen	Windows Server, Solaris, Red Hat, Debian, SUSE, CentOS
3Tera Applogic Virtual Private Servers Virtual Private Data Center	www.3tera.com	Web hosting, transactional Web applications	Xen	Windows, Solaris, Red Hat, SUSE, Debian, CentOS
Unisys Unisys Secure Infrastructure As A Service	www.unisys.com	Non-mission-critical computing workloads	VMware	Windows Server, Red Hat
Verizon Verizon Computing As A Service	www.verizonbusiness.com/us/products/itsolutions/caas	Web app hosting, test and development, compute on demand	VMware	Windows Server, Red Hat
Zimory Public Cloud Gateway	www.zimory.com	Any	VMware, Xen	Windows, Red Hat, Fedora, Debian, Ubuntu

Company/ Service Name	Prepackaged Images Available	Custom OS Images	Database Support	Web Server Support	Server Memory	Server Disk Space
Amazon.com Elastic Compute Cloud	Yes	Declined to state	SQL Server, Oracle, IBM DB2, MySQL Enterprise, others	IIS, Apache, WebSphere, others	Standard: 1.7, 7.5, 15 GB	Standard: 160 GB, 850 GB, 1,690 GB
AT&T AT&T Synaptic Hosting	Yes	No	SQL Server, MySQL, Oracle	IIS, Apache, lighttpd, Mongrel	Up to 32 GB	36 GB to 146 GB
GNI GNi Dedicated Hosting	Yes	Yes	SQL Server, Oracle, MySQL	Apache, IIS, others	1 GB to 64 GB	36 GB, 73 GB, 146 GB
IBM Computing On Demand	Yes	Yes	Any	Any	Varies by server/cluster	Varies by server/cluster
Rackspace Cloud Servers	Yes	Not at this time	Any Linux-compatible database	Any compatible with Linux	256 MB to 15.5 GB	10 GB to 620 GB
Savvis Savvis Open Cloud Compute	Yes	No	SQL Server, Oracle, IBM DB2, MySQL	IIS, Apache	2 GB to 16 GB	32 GB, with 50-GB increments
ServePath GoGrid	Yes	Not at this time	SQL Server, MySQL, PostgreSQL	Microsoft IIS 6/7, Apache 2.2	512 MB and 1 GB, 2 GB, 4 GB, 8 GB	30 GB, 60 GB, 120 GB, 240 GB, 480 GB
Skytap Skytap Virtual Lab	Yes	Yes	Any x86-compatible database	Any x86-compatible	256 MB minimum, 4-MB increments	10 GB, with 1-GB increments
3Tera Applogic Virtual Private Servers Virtual Private Data Center	Yes	Yes	Any Windows- or Linux-compatible database	Any compatible with Windows, Linux, Solaris	1 MB to 64 GB	10 MB to 2 TB
Unisys Unisys Secure Infrastructure As A Service	Yes	No	SQL Server, Oracle, MySQL	Apache, IIS	2 GB to 1 TB	100-GB increments
Verizon Verizon Computing As A Service	Yes	No	SQL Server, Oracle, MySQL	IIS, Apache	1 GB, 2 GB, 4 GB	20 GB, 50 GB, 100 GB
Zimory Public Cloud Gateway	Depends on provider	Yes	Any Windows- or Linux-compatible database	Any compatible with Windows or Linux	Depends on provider	1-GB increments

Company/ Service Name	Server Pricing	Minimum Service Contract	Minimum Server Instances	SLA Service Elements	SLA Guarantee
Amazon.com Elastic Compute Cloud	Standard: Starts at 10 cents per hour for Linux, 12.5 cents per hour for Windows	None	Declined to state	Declined to state	99.95%
AT&T AT&T Synaptic Hosting	Declined to state	Annual	1	Network, OS, database, apps	99.7%
GNI GNI Dedicated Hosting	Declined to state	Monthly	None	Network, hardware, and storage	100%
IBM Computing On Demand	\$5,700 annual membership, plus per-CPU pricing	Annual	None	Network and hardware uptime	Depends on data center location
Rackspace Cloud Servers	1.5 cents per hour for 256 MB RAM, 10 GB disk space	None	None	Network uptime	100%
Savvis Savvis Open Cloud Compute	\$499 per month for a single core, 4 GB RAM, 32 GB disk space	Monthly	None	Cloud instance	99.9%; additional application SLAs up to 99.99% are available
ServePath GoGrid	19 cents per GB RAM per hour	None	None	Server uptime, network performance, persistent storage, server reboot, more	100% uptime; for every hour of downtime, customer gets 100 hours free
Skytap Skytap Virtual Lab	Starts at \$500 per month	Monthly	5	Service uptime	99.9%
3Tera Applogic Virtual Private Servers Virtual Private Data Center	Starts at \$500 per month	Monthly	None	Service uptime	99.999% for virtual private data center
Unisys Unisys Secure Infrastructure As A Service	Declined to state	Annual	1	Server and OS instance availability, others	99.9%
Verizon Verizon Computing As A Service	\$250 per month plus daily use	Monthly	Monthly	Service uptime, network availability, server patches, server provisioning, others	100% if Verizon manages servers
Zimory Public Cloud Gateway	Gold level: 0.20 euro per hour for up to two CPUs	None	None	Service uptime	Three tiers: 99.8%, 99.95%, 99.99%

APPENDIX 3.2: SAAS-INTEGRATORS (Source: Herbert, 2010)

	Key SaaS apps supported	Customers	Revenue	Employees	US locations	Non-US locations	Founded
Appirio	Google Apps Salesforce.com	2,500 +	\$20M +	150 +	San Mateo, Calif. (HQ) presence in 22 other states	Tokyo Jaipur, India	2006
Astadia	Amazon Web Services Eloqua Right90 Salesforce.com Xactly	1,900 +	\$20M +	200 +	Dallas (HQ) San Francisco Boston Atlanta Washington, D.C.	London Bangkok, Thailand Gurgaon, India Singapore	2002
Bluewolf	Big Machines Eloqua Google Apps Marketo SuccessFactors Salesforce.com	3,000 +	\$30M +	200 +	New York (HQ) Boston Atlanta Chicago San Francisco	Berkshire, UK	2000
CoreMatrix	Aprimo Salesforce.com	675 +	\$10M +	80 +	Red Bank, NJ (HQ) Tampa, Fla. New York San Francisco San Diego Dallas Houston Boston		2002
Model Metrics	Adobe Flex Amazon Web Services Google Apps Salesforce.com	500 +	\$10M +	75 +	Chicago (HQ) New York San Francisco Los Angeles Minneapolis, Minn. Detroit Dallas		2003

Source: The companies, Forrester estimates, and various public domain sources

APPENDIX 5.1: SAUGUTUCK SaaS SCENARIOS (Source: ITR Manager.com, 2009)

Figure 1: Saugatuck SaaS Scenarios, 2009 – 2012 / 2014

SaaS Scenario	Key Aspects	Market Impact	Relative Likelihood	
			2012	2014
Niche	<ul style="list-style-type: none"> SaaS / Cloud are useful components of some user systems. Adoption limited primarily to departmental / divisional initiatives, or by lack of functionality, capacity, bandwidth, or skills. IT complexity increases; IT management costs grow. 	L	L	L
Agent of Change	<ul style="list-style-type: none"> SaaS / Cloud enable significant change within user IT and business, and vendor models, but fail to significantly displace entrenched vendors / systems. IT and business operational improvement is enabled at 5%-20% lower cost. By YE2012, SaaS/Cloud account for less than 25% of new IT workloads. 	M	M / H	L / M
Defense of the Entrenched	<ul style="list-style-type: none"> Most customers bypass SaaS and focus on re-deploying traditional on-premise business apps on a cloud infrastructure, which they assume will be cheaper than in-house. ISVs view SaaS primarily for hybrid line-extension opportunities (by function and by customer segment). Few successfully re-architect leveraging a pure multi-tenant SaaS model. Variations on a hybrid Software + Services approach by the Master Brands (e.g., MSFT, SAP, ORCL and others) serve as a foundation for continued market dominance. By YE2012, SaaS / Cloud account for less than 25% of new IT workloads. Triggering events, especially around data security, re-enforce this scenario. 	L / M	M	L / M
Integrated and Integral	<ul style="list-style-type: none"> SaaS / Cloud become integral to infrastructure, systems, operations, and development. SaaS / Cloud vendors deliver / support integration across SaaS & legacy technologies, as end-to-end workflows span integrated solutions. IT shifts focus to managing the business solutions portfolio. 3-5 next-gen Master Brands combined with a handful of legacy Master Brands able / willing to invest, lead the agenda. By YE2012, SaaS / Cloud account for 25%-40% of all new IT workloads. 	H	M	M / H
Utility World	<ul style="list-style-type: none"> SaaS / Cloud become de facto IT for the majority of user firms. IT becomes a true utility; IT management emphasis shifts to managing innovation rather than planning and budgeting. Most legacy Master Brands survive by evolving their bus / tech models – however a new set of Master Brands dominate the agenda for new innovation / spending. By YE2012, SaaS / Cloud accounts for more than 40% of new IT workloads. 	H	L / M	M

Legend: L = Low, L / M = Low / Medium, M = Medium, M / H = Medium / High, H = High