D.3.1 Strategic planning for cloud adoption

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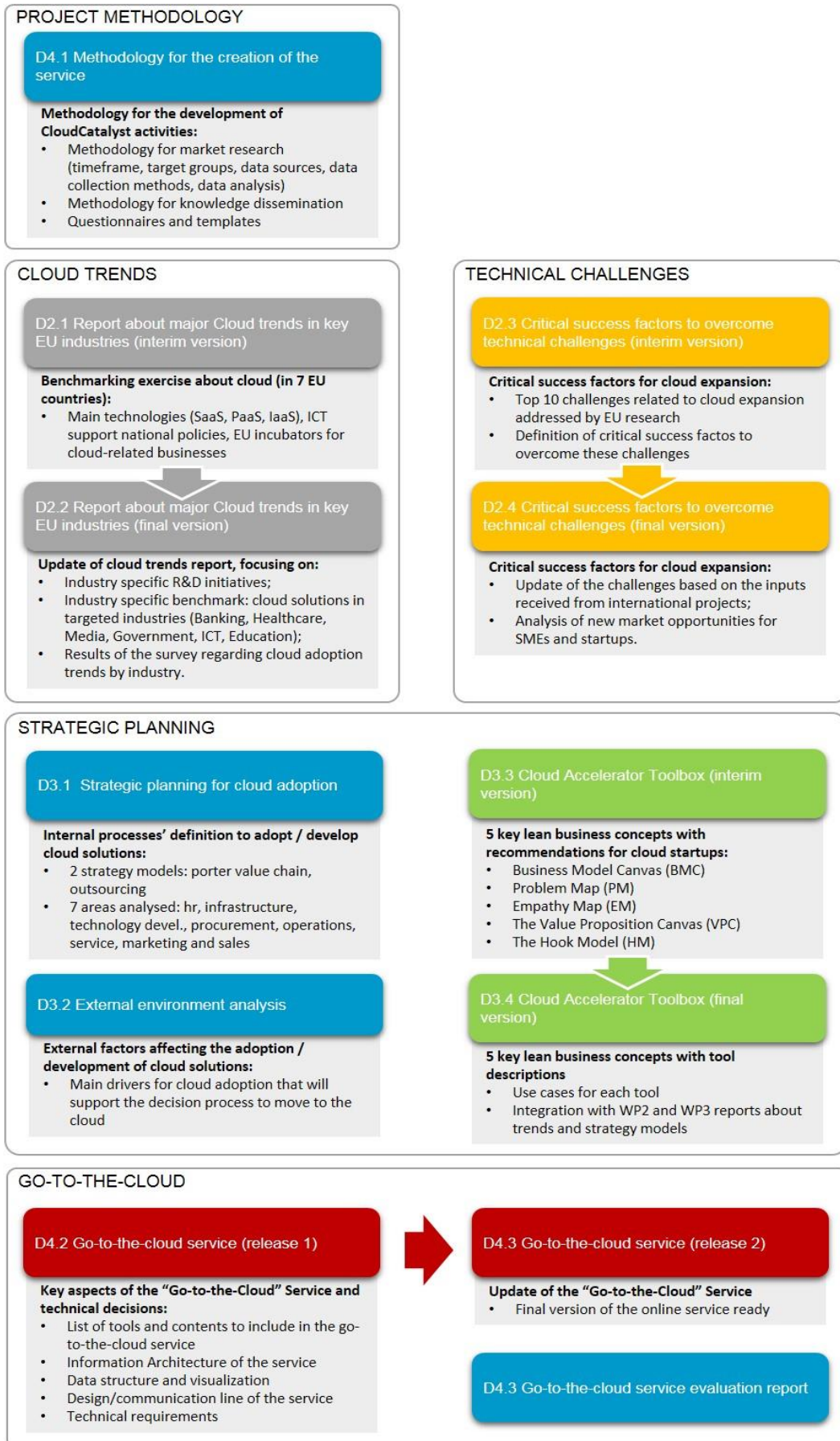
Statement of Originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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- Methodology for knowledge dissemination
- Questionnaires and templates

Recommended reading order

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STRATEGIC PLANNING

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D3.1 Strategic planning for cloud adoption

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Executive summary

Cloud represents a fundamental shift in how technology is acquired and managed. This shift can result in pressure on companies when their structures, culture, policies and internal practices, have not evolved to address the changes inherent in the cloud computing paradigm.

This report will analyse these critical changes, from the point of view of the companies that are now developing new cloud products and services and adapting their strategy to the cloud model. Therefore, as defined in the DoW, the main target of this report are start-up entrepreneurs and researchers intending to create a cloud computing related business.

The main goal is to help companies to take advantage of the cloud computing opportunity. Businesses best able to adapt to this new model will establish a strategy that, if executed well, can pave the way for significant cost savings, optimized processes, and improved controls for cloud computing users.

Therefore, this document will give an overview of the internal factors that a company has to take into consideration when creating and managing cloud solutions. The process areas will vary by type of company so the consortium has selected strategic areas that common to all the companies operating in the cloud computing market.

WP3 reports of CloudCatalyst project will provide valuable insights for cloud computing planning. While D.3.1 presents the internal strategic planning, D.3.2 analyses the external environment of cloud industry. These two deliverables will allow the development of Cloud Accelerator Toolbox (D.3.3.) that will act as a guidelines framework for cloud community, defining how cloud solutions can be successfully implemented and later proven on the market.

1 Purpose and scope of the deliverable

This report is a very straight forward guide about the critical internal areas that need to be considered when creating cloud services and products. It is structured in the following way:

- Chapter 2 summarizes the existing literature on the **outsourcing model** as the framework chosen to provide a context for cloud adoption key factors, used to analyze cloud strategy in organizations.
- Chapter 3 gives a brief overview about **Porter's value chain** describing the benefits of moving to the cloud and the risks and barriers an organization will face in the process of developing cloud products and services.
- Chapter 4 describes relevant insights related to internal cloud strategy definition. The impact of cloud in organizational structures and processes will be the main focus of analysis. Based on the observations and insights obtained from the theories and survey, it defines a **decision support tool for internal analysis of cloud adoption**.

The main purpose of the report is to highlight the main factors that should be taken into consideration when defining an internal strategy to facilitate a smooth transition to the cloud and simplify the development of innovative products and services.

To achieve this goal, a sequence of actions was classified into four categories as detailed bellow:

1. Define the target scope

- Identify the main target group of the deliverable (Start-up entrepreneurs and researchers intending to create a cloud computing related business) and their requirements in terms of cloud adoption and expansion.

2. Literature review

- Identify and classify the most important models to define a successful cloud strategy and analyse the impact of adoption in the organizations
- Select the most relevant benefits and risks

3. Data analysis of the main results of the survey

- Select the most relevant questions
- Identify trends that are relevant to the report
- Develop recommendations related to the internal strategy definition

4. Matrix for internal analysis development

- Decision support tools for internal analysis of cloud adoption and development

2 Outsourcing as a cloud adoption model

This chapter examines the outsourcing model to analyze the organizational change and the dynamics that result between the stakeholders within and outside the organization as a result of cloud adoption. Understanding the outsourcing is very important to recognize the strategic implications of adopting cloud-based services, once certain aspects of cloud operations are similar to an outsourcing model.

According to Nabeel Qirim[1], the main reasons an organization chooses outsourcing services are:

- access to experts,
- get higher quality service from the outsourcer,
- access to new technology
- cost reduction

Gartner[2] also points out that a strong reason for outsourcing is the lack of available resources locally. This is particularly true for **IT outsourcing**. Other motivations for outsourcing include gaining competitive advantage, rolling out new IT projects in a short period of time and organizational restructuring and downsizing.

Therefore, **Cloud computing represents a new way to outsource IT resources**. With SaaS, the outsourced resource is application software; with IaaS, computing hardware (servers, storage devices etc.); with PaaS, hardware plus a development and hosting software platform. Concerning IaaS services, data centers will bring growth across the IT services spectrum once outsourcing model is becoming more common in large enterprises.
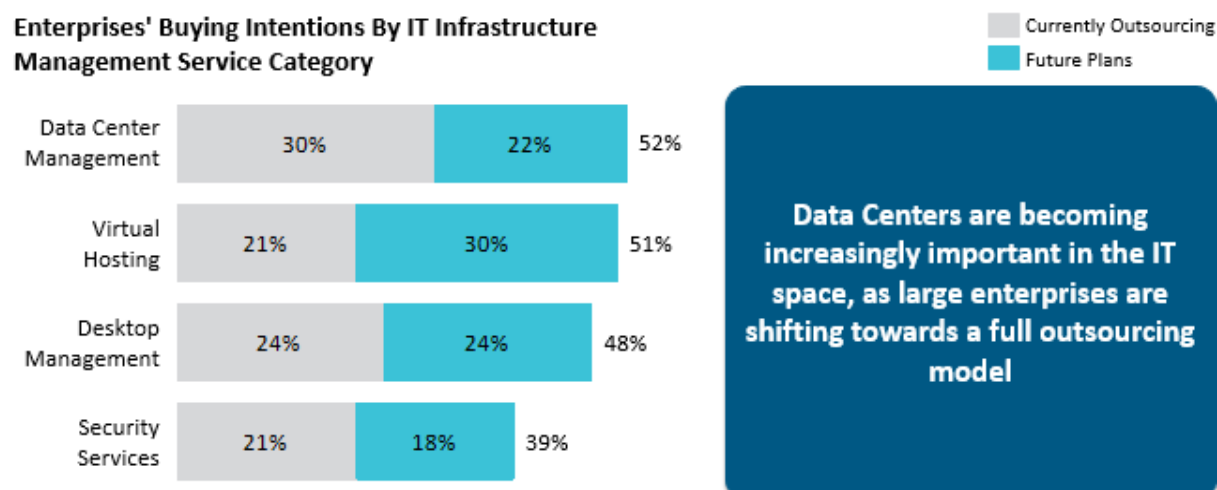
Fig. 1 - Forrester - IT Infrastructure Survey – 347 European Enterprises with over 1000 emplyoyees

Nevertheless, there are several key differences between traditional outsourcing and cloud computing. Current legislation does not cater adequately for differences between public

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[1] The strategic outsourcing decision of IT and eCommerce: The case of small businesses in New Zealand. Journal of Information Technology Case and Application Research, 5(3), 32-56

[2] Gartner, The Shift from Traditional IT Services to Cloud Service

shared-infrastructure IaaS and PaaS (ie infrastructure services), or differences arising from individual services' designs.

Nabeel Qirim also studied the situations when organizations are most prone to adopt an outsourcing model:

- Easy access to additional capacity;
- Crisis situation in the external environment that pushes companies to opt for outsourcing as a means to reduce cost.
- Availability of new technology or software in the market and incapacity of the internal staff to perform the task cause organizations to seek help from external environment.

However, the outsourcing model poses certain challenges that organizations should pay attention to:

- Sufficient due diligence both in the choice of the supplier and the product/service offered
- Drafting the contract effectively and ensuring there are provisions to address under-performance/non-performance by the supplier
- Avoiding over dependence on a single outsourcer
- Building adequate skills in vendor management which includes contract negotiation, conflict management

2.1 Outsourcing vs Cloud Computing

Market dynamics are shifting from the traditional IT services (the "old way") to cloud services (the "new way"). Fig. 1 summarizes this shift by looking at process, deal structure and delivery models.

	The Old Way	The New Way
Sourcing Process	The sourcing life cycle included much customization, so agreements required long negotiation periods (often six months or more).	Readymade solutions that are highly virtualized and standardized, with agreements that are standard and available to sign immediately. (Just click the "I accept button.")
Deal Structures	Often highly customized and complex, leading to inflexible and lengthy terms (for example, multinational, multicountry, including asset and people transfer).	Simpler, more flexible and optimized to be efficient (for example, asset-free, "as a service").
Delivery Model	1:1 (heavily people- and asset-based).	1:Few (utility), 1:many (cloud) (highly standard and automated).

Fig. 2- The Shift from Traditional IT Services to Cloud Service[3]

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[3] https://www.gartner.com/doc/1604814#a-657888792

As the cloud industry matures, it also seems likely that the range of cloud services will expand to include business processes. In smaller organisations, this is already happening. The size of the IT staff in such companies, makes it easier to buy services from the cloud as the business grows. The flexibility to grow and shrink as required is also attractive to smaller businesses, which are more volatile.

As described in the table above, long-term contracts are likely to wither away in favour of more flexible, short-term agreements, while providers will need to move closer to their customers because they will be running their IT (and therefore their business) for them.

The present report will address these concerns in Chapter 5 describing how the cloud affects the sourcing strategy and contracting, providing information about sourcing strategy, vendor selection, contracting, management and governance.

3 Value chain as cloud development model

A value chain is a chain of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market. The concept comes from business management and was first described by Michael Porter[4].

For the purpose of the present report, **the consortium adapted the value chain to companies moving from traditional IT business to cloud computing business model**, showing how to deliver valuable cloud products and services by revising primary activities – Operations, Marketing and Sales and Service (Logistics stood out of scope). Support activities – Procurement, Human Resource management, Technological Development and Infrastructure – are analysed from a cloud end-user perspective. **Some of these areas have been adapted to current market trends and cloud company specific requirements.** Also, we will correlate all these factors with the results of the survey ran by CloudCatalyst consortium in order to identify the most adequate cloud computing strategy according to the specific needs of the companies.

There are several benefits associated to moving to the cloud, such as:

- Increasing efficiency of computing, commonly called virtualization ability;
- Democratization of computing, meaning the access by small and medium business to an enterprise grade infrastructure;
- Scalability, fast provisioning and also a commoditization of infrastructure, providing IT department the possibility to focus on more strategic aspects of the business activity.

This movement has a continuous positive impact in organizations, that should be accompanied by changes in company's internal environment, namely in form of business process reviews. Therefore, **this section aims to bring up some key considerations that cloud users and providers should take into account when adopting/developing a cloud service.**
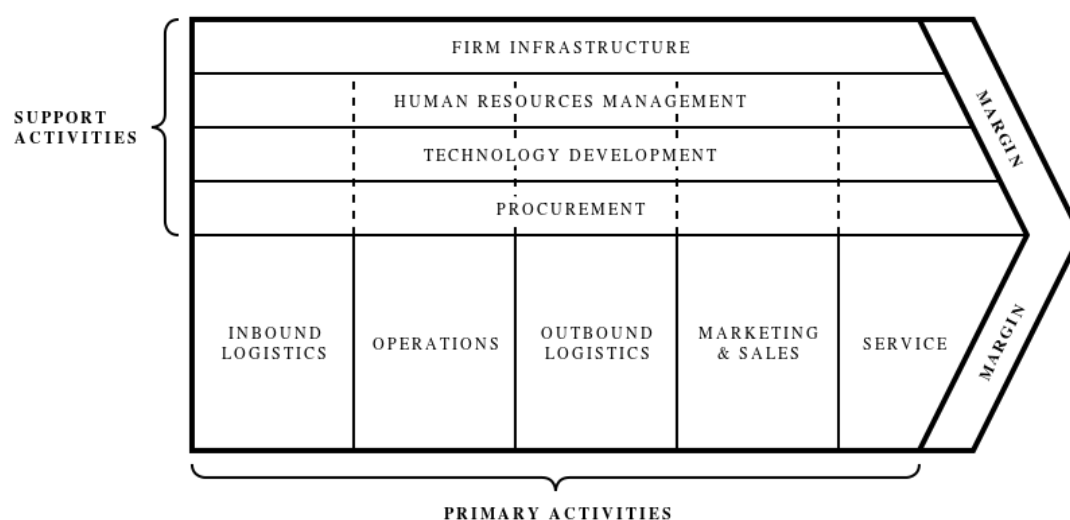
Fig. 3 - Michael Porter's Value Chain

This section follows the concept of value chain as a decision support tool for start-up entrepreneurs and researchers intending to adopt cloud solutions, through the analysis of the support activities of the value chain.

It is also intended to help those small and medium businesses that are moving to cloud business defining their internal cloud strategy, by analyzing and making recommendations related to primary activities.

Finally, we will correlate value chain activities with the results of the survey ran by CloudCatalyst consortium in order to identify the most adequate cloud computing strategy according to the specific needs of the companies.

The first consideration to take into account is that it is not mandatory to have all the expertise under the same roof. The most efficient way to run a Cloud business is to do what you have more expertise in and leave the rest to the right experts, investing on creating strategic chain partnerships. Despite the relevance of technologic issues when moving to the Cloud business, it is the internal environment issues that will remain persistent over the time and that will be analysed in the next pages.

3.1 Infrastructure

When adopting Cloud solutions, the first decision to be taken is related to technical considerations.

There is an understandably confusion among organizations related to the decision process of which applications should be first to migrate to the Cloud. This confusion is motivated by two main facts. The first one is related to those traditional vendors condemning any shift to the Cloud. The second one relates to those vendors that foster a total move to the Cloud.

Basically, from a cloud-user perspective, a logic way to balance these two approaches is to prioritize the application's migration to the Cloud based on two main criteria. This way, the prime application candidates to migrate to the Cloud should be those applications that have more interactions with other external applications or services and that are not a key differentiator of the company from its competition.

Based on a survey performed by consortium, this consideration can be corroborated if we filter the data to obtain Small and Medium business responses (companies with up to 50 employees).
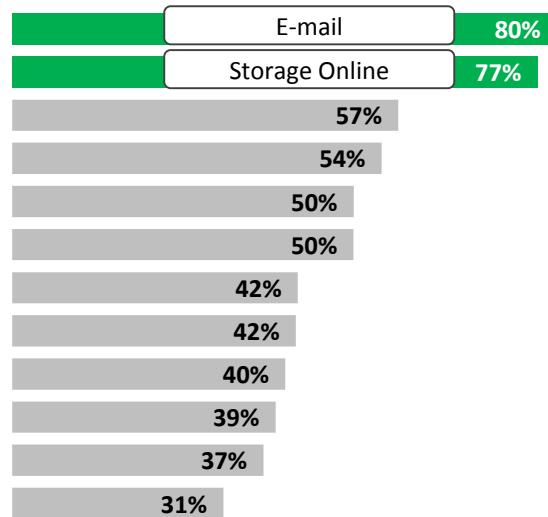
E-mail	**80%**
Storage Online	**77%**
57%	
54%	
50%	
50%	
42%	
42%	
40%	
39%	
37%	
31%	

Fig. 3 – Top 2 applications to migrate to the Cloud

The above graph shows us the enquired companies chose as top 2 applications to migrate to the cloud E-mail and Storage online, as these applications are easier to migrate and do not imply large integration efforts.

3.2 Human Resources

CLOUD USER

A move to Cloud Computing undeniably has a relevant impact on Human Resources in a company that uses cloud solutions, in several ways. One of the most immediate symptoms is the change in IT department role and responsibilities. In the long run it is estimated that companies will no more need systems administrators. But, while Cloud Computing limits opportunities for some skills, on the other side, it fosters the development of other new capabilities related to Cloud management, such as application customization and agile development. Hence, companies should be encouraged to invest in training their human resources in order to explore these new technical areas.

Nevertheless, a lack of formal qualifications in the area of Cloud Computing is perceived by end users, and thus, it is considered as a bottleneck by companies, that cannot find the right certified partners, to move to the Cloud, as the following graph shows:

Lack of Certified Providers

34%
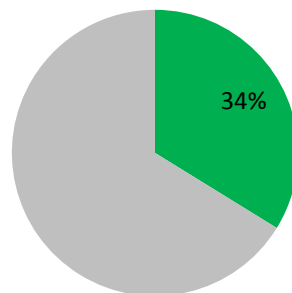
Fig. 4 – Percentage of companies that find Lack of Certified Provider an important Cloud barrier

Accordingly to the above graph, it can be concluded that 34% of the enquired companies consider lack of certified partners as an either important or very important cloud barrier, revealing the importance it has to find the right certified partners.

While it is actually a barrier, we believe this issue is going to be solved in a short run, given the number of informal and accessible training opportunities, either vendor specific or vendor neutral, that are in place in the market, that will help and give more confidence for companies to move to the Cloud. This way, it is predicted that lack of formal qualifications will not be any more considered as a barrier in the medium term.

However, not only formal qualifications can be an inhibitor for a Cloud shift. Under Human Resources matter, there is always a much more intrinsic and common feeling of threat that causes opposition from employees to move to a Cloud Business. And it is not indeed a specific situation related neither to Cloud nor to IT in general. A fear related to change is a very common pain in companies.

As a result of the survey, the relevance of information, or rather, the lack of it, arises as follows:

Lack of information about cloud
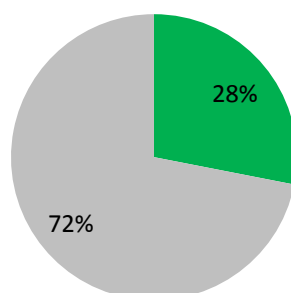
Fig. 5 – Percentage of companies that find Lack of Information about Cloud an important Cloud barrier

This graph shows that 28% of the enquired companies consider lack of information about Cloud as a barrier to migrate to these kind of solutions.

The key recommendation for this issue in a cloud user company is a good change management strategy based on a transparent top-down communication, spreading information about the benefits of Cloud Computing among employees. It is important to highlight it as an opportunity and demystify the threaten feeling. Rather, companies' management should actually act at the root cause level, by partnering with Human Resources department for an efficient employee buy-in.

3.3 Technology Development

Cloud computing has evolved at a rapid pace. As this evolution happened, some issues were raised on demand side, by the end-users on security and data protection areas. This happened to be even more important when the demand came from business areas, other than IT department, that has typically matured its security policies.

The rush for innovation and the adaption to agile development came alongside with the underlined risk of having less rigor.
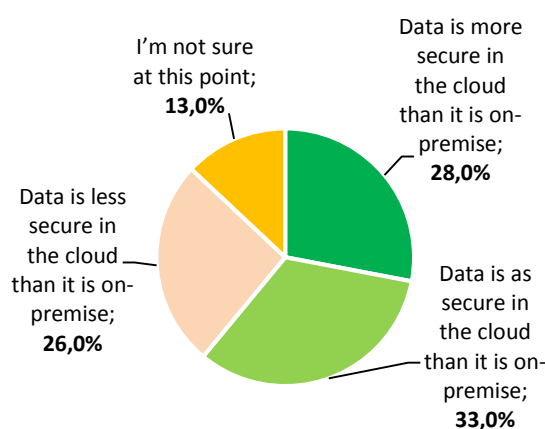

Fig. 6 – How companies classify data security in the cloud versus on-premises

Through the analysis of the above graph, we can conclude that as of today, most companies are already confident in cloud security, since more than a half of enquired companies think that data is at least as secure in the cloud as than it is on-premises.

There are three main areas that cloud computing providers should address in order to mitigate non-compliance risks. The first one is related to both privacy and data sovereignty. The first concept is actually the ability to keep confidential data as non-disclosure. Data sovereignty means that data that is stored and converted into binary digital form is compliant with the lows of the country where it is located. The most suitable recommendation is for companies to define their own privacy and data sovereignty framework, since the related laws may vary substantially from one country to another, and hence, have relevant impact in cloud and storage architectures.

The second area is related to the cloud platform itself that must have the right security mechanisms in order to ensure it is safe. From an access standpoint, it should be secured with API Firewalls, Web Application Firewalls, and Advanced Persistent Threat solutions. Regarding applications, they should have security mechanisms, namely authentication processes, to ensure only authorized user can actually access the application and only see the data they have access rights to.

Finally, the third area is related to orchestration and automation systems. These systems provide the possibility to actually deliver, operate, manage and maintain a cloud. But the most risky aspect is that these systems are usually considered trusted as they are "behind the firewall". The key recommendation in this area is to first consider this as untrusted, apply regular security mechanisms and avoid single accounts access with usually standard passwords.

3.4 Procurement

CLOUD USER

Along with cloud adoption, procurement management is continuously facing the challenge of generating cost savings to the company, in order to enable business to keep its margins.

As Cloud computing brought new technology solutions, the nature of procurement management has changed and the focus shifted from dealing with individual suppliers towards a new challenge of dealing with large data available. The improvement on data management is opening up a set of new possibilities to deal with vertical supply marketplaces. This is now accelerating the source-to-pay process enabling procurement management to add more value to business. From the perspective of cloud users, it is fundamental that the procurement managers are ready and familiar with this new reality in order to keep up the agility of the process.

Additionally, cloud also brings some uncertainty for procurement management. This is related to the fact that in traditional model, when provider releases new features, customer can choose whether to install it or not. In cloud model, as providers revise their services on a regular basis and it automatically flows to the customers, it can make procurement a bit uncomfortable for not to be sure what it buys will still be there tomorrow.

3.5 Operations

CLOUD PROVIDER

From a cloud provider perspective, Cloud computing is all about delivering a service to an end-user, which expectations and SLAs have to be met, what can be ensured by IT department. Just like in traditional datacenters, IT must have performance management as a top priority in cloud business at the expense of a bad user experience delivery.

In traditional physical IT world, if a problem occurred causing an impact on CPU usage making the service to use it on 80 percent, it would not be a major problem, as probably there would be only one service or application running on it. However, in a virtual world with a shared resources basis it might become more important to solve, as virtualizing more than one workload in a server can provide cost savings. So, in a cloud based business, such a problem can quickly become expensive, meaning waste of resources, once usage is generally measured on a pay-as-you-go basis. It can be applied either for public or private cloud.

For all of the above, it is highly recommended cloud operations to set baseline performance metrics of those resources that cost money for the end-user, and then, monitor those metrics against its baseline.

If there is no such control process, a problem could only be detected from IT department when it impacted the end-user. And, given the agility the customer has to change provider on a cloud business, it can mean a severe loss for the cloud provider.

3.6 Marketing and Sales

CLOUD PROVIDER

For a Cloud provider, regarding marketing and sales, one of the key recommendations is to providers to segment the customer base, by tiering their readiness for adopting cloud solutions. It can be done through the analysis of historic license spending or total on-premises product revenues per customer. Also the customer's size tiers can give some tips as typically larger businesses will demand more dedicated solutions.

Once customers start consuming cloud services, more accurate data will be available providing valuable insights about customer's behavior and enabling the provider to take the right decisions to foster a subscriber growth.

Another important consideration for those companies providing on-premises software and moving to the cloud is that, while on-premises companies typically focus on large enterprise sector to infer the overall demand, it is important to know that small and medium sized companies are showing an increasing interest for cloud solutions and the small and medium sized business cloud market is expected to grow in the next few years.

Regarding the sales model, one should note that selling an on-premises solution is much different from selling an on subscription application. So the recommendation is to keep the as is sales model for on-premises solutions, and define a new and suitable one for on-demand business. This, actually, can be complex to manage, but deciding to leverage one model for the two businesses can be very challenging and sometimes risky.

When talking about sales force, the key success factor is to hire and/or train talent in order to allow sellers to always have the most up-to-date information about their service catalog, key features, release cycles, value proposition and post-sales support services. Hence, while on-premise sales representatives may have training about once a year on average, since cloud services incorporate frequent changes at a rapid pace, sales force should be re-trained as many times as needed, so that the know-how development can meet the release cycle's pace. The sales force should also be able to make some kind of pre-sales consultancy, and demonstrate cloud product's agility, flexibility and scalability.

As companies review its sales model when moving to Cloud, it is also recommended the incentives model to be aligned with the new business. This way, incentives should be related to subscription revenues, contract renewals and customer retention, rather than an annual-based reward as traditionally happens in on-premise business. This should be even more taken into account in those cases when one sales representative sells Cloud and on-premise products simultaneously.

Also the sales process should follow the business changes when moving to Cloud. Actually, between on-premise and cloud sales process, there are many common characteristics. In both business models there should be an account planning and the commercial opportunities should be monitored in a proper commercial framework. However, it is important to note that Cloud business sales process can have much more intrinsic variability. While for small companies the sales process can be as quick as the time needed to do a sales call, a proposal, a contract and the launch in a row, for a large company, the process can take months to complete. Hence, we recommend providers to change from a universal sales process, fitting all kinds of products, to a set o differentiated sales processes per market segments previously identified.

A channel strategy should also be reviewed when moving to Cloud. Most technology provider companies sell both through direct and indirect channel. In the second case, a key success

factor is to develop an easy and clear value proposition for partners. In traditional on-premise business the reseller usually purchases the product from provider, possesses it and resells it to the customer, assuming a set of responsibilities towards the client, even those related to the performance and security of the product. In cloud business, however, the Cloud provider must be willing to accept more risk and responsibilities, since the product doesn't actually change hands.

Support phase is something that is crucial to be also included as part of the sales process, either in direct or indirect model. This is a natural consequence of the customer easiness to change cloud provider, so it is important to know that customer experience should actually be a measure of business success, monitored in sales process, since an unhappy customer is, almost for sure, a lost customer in cloud business. In Cloud, customer experience is a driver for product and support design, as they are crucial for customer renewal and confidence. We clearly recommend companies moving to the cloud to include support phase on sales process, so that the seller is involved in all phases of the product's lifecycle and is also responsible to keep customer's satisfaction.

3.7 Service

In Cloud computing business, there are three service models to deliver a cloud service with different levels of outsourcing management. In order to better understand, it is suitable to think about it as service layers.

The first one, Infrastructure-as-a-Service is a service in which customer manages the whole applications, data, operating system, middleware and runtime, while provider manages the virtualization, servers, storage and network. Its benefits relate to cost savings in hardware and human capital, reduction on ROI risk and automation of service scaling.

Platform-as-a-Service, the second cloud service model, is when customer manages the application and data, while provider manages everything else. This layer is ideal for a customer who is interested on application development and testing, once there is no upfront investment related to hardware and it is also not necessary to hire people to maintain these systems. Also, scalability automation is ensured for the customer.

Finally, there is Software-as-a-Service, where cloud provider is responsible to manage all portions of the service. As long as connectivity is available, customers will be able to access the software anywhere, what can have positive impacts in collaboration and productivity.

Regarding billing methods, cloud computing service providers typically bill resources on a pay-as-you-go basis, which gives customer an unprecedented flexibility to scale its service. This way, resources are actually charged based on its use versus the whole infrastructure.

When talking about Cloud services, there are some other service characteristics that have to be ensured, in order to deliver an actual cloud service experience.

An application access based on customer convenience is one of the key characteristics that have to be ensured, hence, the application must have high availability in order to be up and running when customer needs it. This, actually, implies that services should be developed on an easy access basis. The cloud provider also should have the right tools for application performance management, so that user experience can be controlled and kept on a good quality standard.

Either in public and private cloud, it is expected to generate economies of scale, while ensuring a rapid provisioning and release of resources at the same time. It is only possible on a resource sharing model, when different customers access the same pool of resources, with the assurance of typical security policies. This means that customers experiencing peaks of performance will be consuming resources from other customers on a non-peak level. This is the way economies of scale can be reached, but it is also important to use management solution capable to assess and track the utilization behaviors from customers and trends against installed capacity of physical and virtual resources.

On the other hand, in terms of rapid provisioning and release of resources, it can be ensured by using solutions capable of provisioning applications based on pre-defined models and templates. For this, products and processes to support the governance of provisioning and release functions are very important to take into account by providers.

4 Decision support guidelines

We previously looked at two models for cloud adoption and cloud development (outsourcing and value chain). Now we will aggregate this information in one matrix to support strategy formulation. It is important to refer that this information will be analysed in detail in the following deliverable D3.3 Cloud Accelerator Toolbox for effective cloud strategy and planning.

In the present chapter the consortium presents a summary of the strategic priorities of companies developing cloud solutions and services. In this case, the role of the supplier and end-user sometimes overlaps and the recommendations can be very similar whether companies are adopting or providing cloud solutions.

Quoting Ignacio M. Llorente's[5] experience about the steps to be taken for a successful migration to cloud computing, *"there is no magic formula, the specific steps will depend on internal structure, industry and differentiation in the market"*. A good suggestion presented is to revise the Decision Framework for Cloud Migration described in the Federal Cloud Computing Strategy together with a thorough study and comparison of cloud providers.
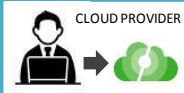
In the points below we will analyze the most important aspects related to people, organization and business. The information is presented from two perspectives: a) cloud user perspective, companies that are on the demand side; b) cloud provider perspective, companies that are developing / providing new cloud services and product, on the supply side.

Value chain activities	Strategic recommendations for Cloud Users
Infrastructure	**Two main criteria for migration:** Prioritize the application's migration to the Cloud based on two main criteria. The prime application candidates to migrate to the Cloud should be those applications that have more interactions with other external applications or services and that are not a key differentiator of the company from its competition.
	Data security: Ensure the security of the information hosted in third party's network. This is especially relevant in a public/hybrid cloud scenario where the cloud infrastructure is hosted and maintained in the service provider's premises. Even in a private cloud, an organization can enforce rules that limit the visibility of data and information to ensure security.
	Shifting from infrastructure to service management: companies should be able to define their needs in terms of services (applications) and their expected quality of service. IT staff usually express their needs and requirements using infrastructure terms (e.g.: I need 4 physical boxes to run the web server for a new site). However needs should be described in terms of service elasticity rules, this is in terms of service level objectives using key

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[5] http://blog.cloudplan.org/2011/06/strategic-framework-for-cloud-migration.html

	performance indicators (e.g.: In order to ensure an optimal quality of service, I need to automatically scale the number of servers when the average CPU utilization of the running web servers exceeds a given threshold)
Infrastructure	**Prioritizing services that are best suited for migration:** This prioritization should be performed according to its readiness to be executed on cloud; its affinity to the cloud model in terms of security, performance, relevance and duration; and the expected gain in terms of costs, performance, quality, agility, and innovation.
	New skills for cloud management: In the long run it is estimated that companies won't need systems administrators. But, while Cloud Computing limits opportunities for some skills, on the other side, it fosters the development of other new capabilities related to Cloud management, such as application customization and agile development. Hence, companies should be encouraged to invest in training their human resources in order to explore these new technical areas.
Human Resources	**Cloud perception and motivation:** Cloud can mean different things to different people and their motivation to adopt cloud varies. Thus depending on the understanding and motivation of the stakeholders the level of commitment to embrace cloud will differ. Adopt a transparent top-down communication, spreading information about the benefits of Cloud Computing among employees. Companies' management should actually act at the root cause level, by partnering with Human Resources department for an efficient employee buy-in.
	Prepare your IT staff for cloud: With the cloud, there's a need for several new skills: language skills to build applications that can run quickly on the Internet; to deal with service-level agreements—and the problems involved when those SLAs are breached—IT pros need experience with contract and vendor negotiations; firm understanding of security protocols and the regulatory mandates related to their industries; knowledge about what kind of mobile experience they are offering to customers via the cloud and how they would like to improve that down the line; as enterprise cloud computing evolves, it is important to have knowledge of open hybrid clouds to understand how to build and extend their companies' cloud computing infrastructure
	Buyers need to invest in two types of skill development: 1) competence in contract management, as the public and hybrid cloud deployment models involve interaction with third party cloud providers. The members within the organization need to be skilled to handle any exigency involving the cloud service provider; 2) facilitate employees within the organization to acclimate themselves with the new business processes and governance structures.

Technology development	**Data sovereignty:** means that data that is stored and converted into binary digital form is compliant with the laws of the country where it is located. The most suitable recommendation is for companies to define their own privacy and data sovereignty framework, since the related laws may vary substantially from one country to another, and hence, have relevant impact in cloud and storage architectures.
	Security mechanisms: Cloud platform itself must have the right security mechanisms in order to ensure it is safe. From an access standpoint, it should be secured with API Firewalls, Web Application Firewalls, and Advanced Persistent Threat solutions. Regarding applications, they should have security mechanisms, namely authentication processes, to ensure only authorized user can actually access the application and only see the data they have access rights to.
	Orchestration and automation systems: provide the possibility to actually deliver, operate, manage and maintain a cloud. But the most risky aspect is that these systems are usually considered trusted as they are "behind the firewall". The key recommendation in this area is to first consider this as untrusted, apply regular security mechanisms and avoid single accounts access with usually standard passwords.
	Customized cloud implementation strategy: organizations should plan software as a service (SaaS), infrastructure as a service (IaaS) and platform as a service (PaaS) strategies, as well as review applicable deployment models, reference architectures and more to assemble a customized roadmap and architecture.
Procurement	**Deliver optimal value for the business:** Organizations' procurement strategies are evolving rapidly due to changing business needs, market dynamics and cloud computing. Suppliers of cloud services should understand the implications of emerging trends on the strategy phase and how related offerings are changing. This will enable organizations to develop a cloud procurement strategy that will deliver optimal value for the business.
	Selecting the best cloud provider: This selection is critical if we consider that given the current lack of interoperability and portability, the change to other provider in the future may be time-consuming and expensive. The following aspects should be considered: data protection, privacy and regulatory issues; support for business continuity; and level of control exposed to users. You could also conclude that best solution is to use different providers for different workloads.

Value chain activities	Strategic recommendations for Cloud Providers
Operations	**Define the cloud readiness of an organization:** One of the essential characteristics of cloud is that it provides measured services where the performance of the cloud can be easily tracked. Cloud maturity models have been developed to define the cloud readiness of an organization. It can be observed that, by centralizing the IT services, improving competence in vendor management and cloud operations, and introducing IT governance structures an organization can realize higher benefits through cloud. These models however get developed over a long run and sustaining the commitment and motivation levels of the employees during this period could be a challenge.
	Monitoring: It is highly recommended cloud operations to set baseline performance metrics of those resources that cost money for the end-user, and then, monitor those metrics against its baseline.
	Issues related to intra-organizational dependence: The change in IT governance mechanisms can bring in change of decision and control rights among the stakeholders within the organization. This increases chances of conflict between the stakeholders, pushbacks and attempts to work around the new governance structure. Thus having a strong leadership support with clear direction will help in the transition process.
Supply chain	**IT Governance:** A cloud model brings in interactions between multiple parties and in certain cases, as a precursor to cloud adoption, an organization can introduce IT shared services model. These situations mandate that a governance mechanism be put in place to clearly specify and communicate where the key decision making related to IT happens. In absence of such mechanisms, there could be ambiguity in decision rights resulting to lower performance of the cloud system and the organization.
	Issues related to inter-organizational dependence: In the case of public and hybrid cloud, the dependence on third parties for cloud-based services can result in loss of control rights for employees of the organization. In addition, the service provider exposes the enterprise adopting public based cloud, to the risk of non-compliance of standards of performance.

Marketing and Sales	**Basic product design principles:** Companies offering cloud services have to consider flexibility, agility and innovation as basic design principles. The market also expects scalability, cost-efficiency and pay-per-use pricing models from cloud services solutions. Although cloud services already provide these, service providers manage their risks through terms and conditions that are still immature. This is definitely a point to improve and a differentiator for developers and providers
	Strong business case for cloud adoption: The organization needs to have a strong business case to support the adoption of cloud and also forecast the benefits achieved by deploying cloud-based services in the organization.
	Sales process: While for small companies the sales process can be as quick as the time needed to do a sales call, a proposal, a contract and the launch in a row, for a large company, the process can take months to complete. Hence, we recommend providers to change from a universal sales process, fitting all kinds of products, to a set of differentiated sales processes per market segments
	Channel strategy: should also be reviewed when moving to Cloud. Most technology provider companies sell both through direct and indirect channel. In the second case, a key success factor is to develop an easy and clear value proposition for partners. In traditional on-premise business the reseller usually purchases the product from provider, possesses it and resells it to the customer, assuming a set of responsibilities towards the client, even those related to the performance and security of the product. In cloud business, however, the Cloud provider must be willing to accept more risk and responsibilities, since the product doesn't actually change hands
	Segment your customer base: by ranking their readiness for adopting cloud solutions. It can be done through the analysis of historic license spending or total on-premises product revenues per customer. Also the customer's size tiers can give some tips as typically larger businesses will demand more dedicated solutions.
	Innovative cloud business models: Companies should develop an innovative business model to support the development of cloud products and services. The most common business models elements to define are customer segments, customer relationship, channels, value proposition, key resources, key activities, key partners, revenue streams, and cost structure.
Service	**Billing Methods**: Cloud computing service providers typically bill resources on a pay-as-you-go basis, which gives customer an unprecedented flexibility to scale its service. This way, resources are actually charged based on its use versus the whole infrastructure.

Service	**User Experience:** Services should be developed on an easy access basis. The cloud provider also should have the right tools for application performance management, so that user experience can be controlled and kept on a good quality standard.
	Customer behavior tracking: It is important to use management solution capable to assess and track the utilization behaviors from customers and trends against installed capacity of physical and virtual resources
	Rapid provisioning and release of resources: It can be ensured by using solutions capable of provisioning applications based on pre-defined models and templates. For this, products and processes to support the governance of provisioning and release functions are very important to take into account by providers