

<http://www.cisjournal.org>

Implementing Cloud Computing in ERP

¹Ahmad Rabay'a, ²Mohammad Dweib, ³Yousef Abuzir

¹MSc, Department of Engineering & Technology, Palestine Technical University – Kadoorie, Palestine.

²Assistant Prof., Department of Technology & Applied Science, Al-Quds Open University, Palestine.

³Assistant Prof., Department of Technology & Applied Science, Al-Quds Open University, Palestine.

[¹ahmad.rabaya@gmail.com](mailto:ahmad.rabaya@gmail.com), [²mdwieb@qou.edu](mailto:mdwieb@qou.edu), [³yabuzir@qou.edu](mailto:yabuzir@qou.edu)

ABSTRACT

Cloud computing is a new technology trend which changed how information systems operated and used, while ERP is one of the most used enterprise applications by the market, and considered the core of many corporations. The fact that ERP systems require high resources in term of cost, time and people in order to be implemented and maintained introduced many difficulties for organizations to set up such a vital system, which was the driving force to try to benefit from cloud computing to help organizations to implement ERP systems with less implementation cost and time. The product of this research was an intersect between the available relevant knowledge, and the market, where some market representatives were interviewed to bridge the gap between theoretical and practical point of views, and get deeper understanding regarding issues and features of ERP as cloud service. The purpose of this research was influenced by the potential benefits of using cloud computing technology to implement ERP systems with less time, cost and failure risk consequences, and how ERP as cloud service could ease ERP implementation and reduce required resources from both customers and vendors. The analysis framework was based on the combination of theoretical base, our own expectations, and the interviews results from the two market representative (suppliers and customers).

Keywords: *Enterprise Resource Planning (ERP), Cloud Computing, Interpretive research, Software-as-a-Service (SaaS), ERP on-demand, ERP as a Service, Interoperability.*

1. INTRODUCTION

Information is the most valuable asset for enterprises; it helps the companies keep track of their business, customers and stakeholders. Many systems were developed to organize and manipulate this information [01]. For that reason, many organizations turned to use some kind of ERP systems over the past few years. Enterprise Resource Planning (ERP) may be defined as business management software that allows an organization to use a system of integrated applications to manage the business. Enterprise Resource Planning (ERP) systems considered as the core of successful data, information and knowledge management, which brought a new way of processing and delivering operational information which enabled organizations to integrate their business functions, and access real-time, up-to-date consistent data. The significant improvement resulted from using ERP systems emerged it as a vital tool for most of the organizations [02][03]. ERP systems integrate the various firms' departments through different business functions to manage the internal resources such as finance, human resources (HR), manufacturing and logistics, and link the firm with the customers and vendors through supply chain management (SCM) and customer relationship management (CRM). ERP systems have evolved to become one of the largest IT investments for many companies during the 1990s [01].

ERP systems offer the market with many features and advantages introduced through an easy to use, real-time, decision support system, which integrates all organization's functions into one system with single database that can be accessed by suppliers and customers to get timely react regarding their needs. However, despite the huge benefits of ERP systems, there are some shortcomings raised due to the huge amount of resources required for the implementation and

big risk of failure, which introduced difficulties prevented small and mid-size organizations from setting up ERP systems. ERP system is a costly and time consuming system to implement, and enclose high risk of failure and disruption to the customer's business continuity process. As ERP systems emerged as a vital tool for many organizations, these difficulties demanded the researchers to search for a new way to implement ERP applications. This research tries to investigate how beneficial it is to use cloud computing to help organizations implementing ERP systems with less implementation cost and time. Cloud computing is a new technology trend stated by the IT industry as the next potential revolution to change how the internet and information systems operate and use [04].

The purpose of this research is to investigate the potentials of using cloud computing technology for ERP systems to deliver ERP as cloud service to the customers with less implementation cost and time. Part of the study paid a special attention to the role of standards by investigating the possibility of achieving a standard to apply ERP as cloud service that might be defined technically and accepted organizationally. This research spanned from studying the knowledge base in this area, interview the suppliers and buyers base, and analyze and compare the interviews results with the theory to bridge the gap between theoretical and practical point of views.

2. RELATED WORK

There are several works and numerous research initiatives that deal with Cloud Computing ERP. Cloud-based ERP systems offer a number of advantages over traditional systems. Some of the advantages include the following: Increased scalability and performance, distribution of cost

<http://www.cisjournal.org>

through multi-tenancy and lower barrier to entry [06]. Cloud computing provides companies with new options for managing infrastructures and new business models. In particular, it provides them with technological possibilities similar to those of large companies. The future of Cloud ERP is going to be an exciting one. People will be transitioning technologies and as a result, many legacy systems will likely be retired. The next years should be very exciting as more and more providers and customer's transition to Cloud ERP [07].

Kapil and Pratap's work is an attempt to find how External Cloud Services (especially SaaS) can help make the customer's total ERP. They concluded that, External Cloud Services makes traditional IT better, faster and cheaper, and has the potential to enable inter-enterprise processes at an industrial scale. IT managers in many cases are finding cloud computing applications easier to use and deploy thus further reducing the time and cost of meeting specific business needs with robust, on demand ERP Cloud Computing technologies [08].

Kiadehi, points that most of work on Cloud Computing and its usage in ERP implementation, only focused on advantage of Cloud Computing. But in none of them on disadvantage and barriers of Cloud Computing that will be affect this new technology. In their work, they showed that, Cloud Computing as new technology has some advantages and security problems that affect the organization decision to implement Cloud ERP [09].

3. RESEARCH METHOLOGIES

This research is an exploratory study consisting of available literature and interviews data analysis. Surveys are a common research method for bridging the gap between financial theory and practice and building extensive empirical analysis [10]. Both ERP suppliers and buyers were interviewed for their opinion about applying ERP as cloud. Surveys served as a way of bridging the gap between literature theory and market practices. The amount and quality of the gathered information required further investigations to understand the human thoughts and actions in order to get deeper insight into the information, which helped to discover any hidden thoughts [10]. Interpretive research used to interpret what interviewees said and in what context to get a better understanding of the collected data. Interpretive research helped to understand the interviewees' thoughts and actions in social and organizational context [11]. This produces a deep insight of the phenomena according to the meanings people assign to them by applying the seven principles of the interpretive research, which we had applied together to get better understanding of the interviewee's answers under their social and organizational context, which made the research as a whole more convincing.

The survey made over the telephone and/or Skype with a representative person from the interviewed company. The interviews were varied on time, between 30 – 90 minutes depending on how excited were the interviewees about the idea, and were willing to share much more information. All the interviews were recorded and reviewed after the interview for deeper study and further investigation and analysis. The

interview questions were designed to be easy to answer by phone, fit with the time, and get as much information as possible from the interviewees. However, not all the conducted interviews were the same, as not all the participants showed the same excitement to contribute in the study. As well as the different ages and backgrounds affected our interpretation for the interviewee's attitudes and views toward the investigated issues, which had main influence on the final results of this exploratory study. The interviews are summarized in Table 1.

4. ERP AS CLOUD SERVICE

Usually information systems built up by different components from different manufacturers using different production and business models. When you are selling one component of a whole system, you cannot compete if your component not compatible with the rest of the system. Here comes the importance of standards principles [12]. ERP is a modular system, where different ERP products are available in the market from different vendors with many different varieties. To have a standard that supports the ability of using modules from different vendors, integrate them together as one system will have great value for the customers.

Table1: Summary of the interviews

Company	Role	Country	Interviewee position	Duration
Lawson	Supplier	Sweden	VP & Product Management	50
Medius	Supplier	Sweden	Regional Manager of After-sales	50
SYSteam	Supplier	Sweden	Product / Marketing Manager	40
Bejoken	Consumer	Sweden	Product & IT-Manager	60
Eldon	Consumer	Sweden	CIO	60
Sapa Group	Consumer	UK	MIS Manager	30
SAS Tech AB	Consumer	Sweden	CIO	90
Cloetta	Consumer	Sweden	IT Manager	45

Cloud computing allows on-demand ERP systems provisioning with zero-installation, fast and easy configuration at low cost, and immediate access in scalable data centers [13]. The difference in on-demand ERP system is that providers will be responsible for the installation, maintenance and upgrades to deliver a ready to run application to the clients. As hardware and software are already installed and ready to use all the clients need is a pc with secure internet connection and web browser [14]. ERP on-demand can contain all the different modules of the on-premise package starting with the core modules such as financials, HR and manufacturing, as well the external modules like CRM and SCM. ERP as service should be delivered in low coupled modules implemented as a set of distributed web services, which means customers can attach and detach modules as they

<http://www.cisjournal.org>

need. Customer's companies can start small with limited number of modules and users then they can add modules and user licenses as they grow. ERP on-demand is suitable when organizations have limited capital budget, limited IT support, or no desire to invest in large IT backbone infrastructure. ERP on-demand delivers a comprehensive set of business benefits to the market, like [14] :

- Easy to deploy without the need for extensive IT experiences.
- Fast deployment – in weeks, comparing to on-premise which takes quite longer time in months and sometimes years.
- No need to build large IT backbone infrastructure.
- Affordable and predictable: close to zero upfront cost, with monthly basis subscription, will make it possible to small-to-midsize businesses to deploy and benefit from such huge and costly ERP applications.
- Time to value: as ERP on-demand can be quickly installed, it will be quickly part of the work process and start producing.
- Flexible: corporations may pick the services based on their needs and capabilities.
- Scalable: organizations can scale up or down their IT infrastructure according to their consumption needs.
- Upgrades and enhancements are done on a regular basis without disrupting the work process.
- Configurations have become increasingly easy to adjust the system to fit the company needs and specifications through a set of parameter settings.
- With the support of SOA, integration with on-premise legacy software will becomes easier.

While ERP on-demand offers customers with many potential business benefits, there are many concern issues customers must consider about ERP on-demand before implementing the system. Some of the vital issues are regarding the quality of service provided and guaranteed through SLA, the security and privacy of the system through different levels includes: web-based access, and data centers protection. Customers must consider as well the provider's capabilities in terms of extra power supplies, and backup and recovery, to ensure business continuity and no disruption would occur that may cause the system to stop or miss-function.

5. MARKET VIEW

This research was based on telephone interviews with main ERP players in the market from both sides - consumers and suppliers. All the interviews were conducted within the Swedish market, except one customer from the United Kingdom. The vendors interviewed during this study represent 3 different types of ERP suppliers. Where Lawson considered a big ERP vendor in the market, and has customers all around the world, Medius considered a smaller vendor with less range of customers, mainly in Sweden and surrounding countries, and SYSteam is an ERP service provider mainly serves small and medium-sized companies. Furthermore, Lawson has their own ERP system, while SYSteam offers many of the most common ERP systems in the market as a service, and Medius offers a system that handles workflow and electronic invoice

management, along with Microsoft Dynamics AX ERP that they offer. On the other hand, the buyers interviewed during this study represent different industrial sectors, and some have more than one market role. Bejoken, Eldon, Sapa, and Cloetta considered distributors, while Eldon, Sapa, and Cloetta considered manufacturers, and Sapa and SAS are assets intensive firms.

5.1 Analyzing the Market View

By holding these interviews, we wanted to investigate issues related to the market view toward the combination between ERP systems and cloud computing. The main theme was the customer's ability to acquire their ERP system as cloud service from the intended vendor(s) on the cloud, with no infrastructure, and minimum up-front cost. During this research many issues were investigated, and varied results have been acquired. Some confirmed with our expectations and theoretical base, where others were surprisingly against our foreseeing. Moreover, the interviewed contacts brought up some points that we had not presumed. On the other hand, we have found many similarities and differences between the interviewees, where some of these similarities and differences seemed reasonable, others seemed more surprising. Here we listed the analysis results of the interviews, based on the theoretical base and the market understanding we gained during this study. Furthermore, we compared the results gained from the different contacts with each other, in order to figure out similarities and differences between the group of suppliers and customers, as well the intersection similarities and differences between the suppliers and customers point of views. The main issues we investigated at this study were:

5.1.1 View About ERP as Cloud

According to the theory in [18] cloud systems must address four main fundamental characteristics: highly abstracted (virtualization), pay-as-you-go, multi-tenant, and immediately scalable. Based on this view, none of the interviewed vendors offers a full ERP as cloud service, as each of the three interviewed vendors offers varied service. At Lawson they offer full ERP system as cloud service with large degree of customization and configuration capabilities, but not considered multi-tenant since each customer has their own dedicated ERP application instance with a dedicated database. On the other hand, Medius offers their ERP as service completely in the cloud with multi-tenancy and hosting, where customers share application instance and database schema, running on a shared virtual machine, but their ERP offering is more like a streamline invoice management system using workflow than a full functional ERP system. SYSteam offers their cloud service a complete ERP or range of pre-configured modules ready for immediate use with no customization and minimal configuration options available for the customers, and without supporting multi-tenancy in their offering.

We did not expect this variation of services offered by the ERP vendors. However we figured out that this variation was reasonable since no unified definition of cloud computing service is common in the ERP market. So most of the vendors relied on different definitions of what ERP as cloud service is, and this created variation between the offered

<http://www.cisjournal.org>

services. Lawson ERP offering considered the most suitable ERP on-demand service as they are offering full ERP systems with large degree of customization and configuration to fit with each client specifications, the only missing cloud propriety is that Lawson ERP is not fully SaaS and not multi-tenancy supported, while Medius are offering a full SaaS ERP system, their ERP is more as workflow streamline invoice management system than a full ERP system. SYSteam offering is not multi-tenancy supported, however, at SYSteam they do not customize their ERP system for each client either the client business fits with their offering or not. Lawson offering is not SaaS (not multi-tenancy supported); they do run full ERP application on the cloud, but we would rather say that they offer ERP system on IaaS infrastructure using Amazon EC2, and not multi-tenant supported. Not being multi-tenancy supported would have a positive impact on Lawson's offering as they can offer large degree of customization to meet the different customers specifications, however, with each new customer, Lawson might need more labor to administer and deploy improvements at every separate copies and versions of the ERP application, which might get more complex as the number of customers increase. The operation cost of the offered service might increase as well; consequently increase the prices for customers, as mentioned in [19]. However, Medius claimed that they offer their ERP system on the cloud as SaaS, which is truly SaaS, but we would considered it more as workflow electronic invoice management system than an ERP system. Being multi-tenancy supported would have positive impact on the offered service price, which gives Medius good competition superiority and significant reduction in operating costs and labor to administer the application copies. However, with multi-tenancy Medius tended to dump down their ERP system functionality to common standardized functions rather than a full functional ERP system. On the other hand, SYSteam is targeting small and medium-sized companies with their ERP as cloud service offering. However, their offering is considered more as pre-configured ERP systems from various vendors on locally infrastructure, delivered to customers by subscription, with no customization, limited configuration options, and not multi-tenant supported.

This variation reflected on the customer's views toward ERP as cloud service, which were varied from positive view about the possibility of achieving ERP as cloud service, to doubts if this would be possible overall. The optimistic views were for reasons like the success and accepted example of the CRM as cloud service, or the vendor's capabilities to handle issues like communication, security, reliability and many others that would make it easier to achieve this goal. The doubtful views were for reasons varied between that the customers will be scared of having the essence of their companies outside their own borders, to the difficulties to make this service applicable in highly specialized market. However, which was an expected and reasonable similarity that most of the participants believed that some areas like modules with out-of-the-box functionalities such as Human Capital Management (HCM) segment might be more promising to be applied as SaaS than modules with higher process and integration complexity like, manufacturing, operation and financial management modules. Moreover, that

ERP as cloud service will add more responsibilities and risks to the suppliers, and reduce the implementation cost for customers.

5.1.2 ERP Modules to be Initially in the Cloud

Even though every vendor had a different view regarding their ERP service offering, every vendor believed that what they offer is the preferred system to be initially as ERP cloud service. This considered unexpected intolerant from the vendors who cared more about marketing their own offering and not to add more responsibilities to their offering than providing a better service to meet the customers' needs. The customer's views on the other hand cared more about their business processes, either by suggesting modules that might benefit their own business or add-ons modules that might not affect the ERP core and their business continuity. As two customers proposed modules that would benefit their business to be initially in the cloud, most of the customers suggested not to have the core ERP modules (finance, human resources, manufacturing and logistics) initially in the cloud, as it is better to start with the add-ons modules or modules with high standardization, and later the ERP core modules can be added gradually. The customer's views were more reasonable when it is about differentiating internal core modules and the modules which link the firm with the external resources such as SCM and CRM modules, as recommended in [02][18] to start with modules with simpler functionalities, and less related to the ERP core modules and their complex processes. Moreover, as stated at [14], SAP Business By Design contains a comprehensive bundled of modules away from the ERP core manufacturing and operation modules. This bundled contains financial management, HR, CRM, SCM and project management modules.

It is a good point of view to start with the less critical modules until the service gains a foothold in the market, then extending the service gradually to cover the whole software package. Furthermore, at the early stages of ERP as cloud service, it is better to start with modules which are less related to the ERP core functionalities [14][18], since these modules have less complex processes, and will not disrupt the customer's business continuity. Surprisingly, one customer had a different view about this issue, as they did not see the benefit of having specific modules in the cloud, as they prefer to have a complete ERP. Although that last point of view was against our expectations, it was surprisingly the case of what happening in the market. we noticed during this study that all customers implemented the whole ERP package from the vendors without taking credit for the modularity option offered by the vendors. However, we found it reasonable to have this varied suggestions as some customers will think about their own business while others will think about the technology possibilities.

5.1.3 Integration Possibility With on-Premise Software

The integration possibility between the on-premise and the cloud would be considered as a crucial and important option to have [20]. ERP on-demand might facilitate communication and integration between ERP and other systems inside or outside the corporation. Most of the interviewed vendors and customers confirmed with the

<http://www.cisjournal.org>

expected answer and agreed about the importance of the integration option between the cloud and on-premise systems. These similarities found reasonable for the importance of the integration between the cloud and on-premise systems option, as customers who already implemented on-premise applications do not have to get rid of their legacy systems to implement new ones on the cloud. Instead they could integrate their old legacy systems with the new systems they tend to implement using cloud services. However, surprisingly one of the customers does not believe this will be a beneficial option as customers prefer to have all the system in one place, either on-premise or on the cloud, which could become less surprising and more reasonable when considering the risk if integration failed between the on-premise software and the cloud. But on the other hand, having the integration option between the legacy on-premise software and the cloud might encourage the old customers to implement ERP functions on the cloud without giving up their already on-house ERP legacy systems, as well might encourage new customers to implement the less critical ERP modules on the clouds instead of implementing the whole ERP package, as ERP as cloud is not matured yet. Most of the interviewed customers have integrated their ERP systems with other on-premise systems, which affirmed their support toward the importance of the integration option between the cloud and on-premise systems.

5.1.4 The Role of SLA in the ERP as Cloud Service

Both vendors and customers agreed that Service Level Agreement (SLA) is necessary as contract between the customer and the service provider, as SLA is the only agreement between the service supplier and consumer [21]. However, there were differences between vendors and customers views toward the role of SLA. Vendors believed that SLA is an enough secure contract for what the customers bought and the level of service customers will expect, and they (vendors) will be able to fulfill all the points of the agreement. While customers asked for more guarantee about the safety and availability of their data. Customers agreed that SLA is necessary as contract between them and service providers, but not enough, as they (customers) suggested that some more penalty points and checking procedures might be added to the SLA to make it more convenient, as ERP is a crucial and critical system for the customer business, they need more emphasis penalties and monitoring procedures to assure the service offered by the supplier. However, ERP as service providers cannot guarantee the customer's internet accessibility, which might be in a different SLA between the customers and the Internet provider.

5.1.5 Modules Customers Bought from Vendors

It was unexpected that most of the customers we have interviewed actually implemented the whole ERP package offered by the vendor. The expectation was that as vendors offered their systems as loosely coupled components, customers would benefit from this modularity option and use just the components they need to save some of the costly ERP implementation costs. According to the customers' responses, they have implemented the whole core ERP modules offered by the vendor, with some other add-on modules in some cases. However, that could be for some other reasons like, they might actually need all the modules in the offered ERP

package for their system, or it would be less risky and easier to implement the whole ERP package as offered by the vendor, which might operate better as single consistence system. Furthermore, most of the interviewed customers have some other applications that interface with the ERP system, like EDM (electronic documents management) and EDI (Electronic Data Interchange), which seemed like functionalities needed by the customers but don't exist in the implemented ERP package offered by the vendor.

5.1.6 Used Any Cloud Service (IaaS, PaaS Or SaaS)

One other surprising finding was that most of the interviewed customers have never used any cloud service. We expected that most of the customers might have implemented or used any cloud service in their business, as the cloud is getting more market share. Except for one customer who is currently using email for local workers as SaaS, the rest of the interviewed customers have not used any cloud services in their business before. Naturally, as most of the customers have no experience with cloud services, it will be harder to start by implementing a critical and crucial system such as ERP in the cloud, as the cloud is still vague for most of them. Though, some of the customers have outsourced parts of their processes to other parties, and almost every company's webpage is outsources and hosted by other companies. This outsourcing experience would be a positive sign that cloud computing might gain the market trust as well, and be applicable into the ERP market in the future. As one participant assured – despite their doubts: “It's a matter of 10 years; we will use the cloud for everything”.

5.1.7 Customer's Resistance Toward The ERP as Cloud

Vendors were very different regarding their views about the customers' resistance toward ERP as cloud service. It was expected that customer's resistance would be mostly about the security, privacy, reliability, portability, and availability issues of the ERP cloud service [18][05][06][22]. Surprisingly these were not the case with the interviewed vendors; even one of the vendors believes that their offering would improve security, availability and disaster recovery than traditional environment. Vendors understanding of the importance of these issues forced them to offer more efficient techniques to ensure their security, reliability, and availability, which might exceed the buyers' capabilities on their on-premise systems [18]. Other interviewed vendors addressed different views regarding the customer's resistance; such as connection and security between the client and the cloud, and the customer's historical way of work and resistance to change. But in general, they all believed that security, privacy, and availability are not critical issues, and they can handle them on their offering. With regards to customer's views the results were varied in an unexpected way, especially in regards to the availability, security and privacy issues, which thought will have the most influence to the resistance. Customers were not concerned about these issues, as they believe vendors will be able to handle them in their offerings, same with not being concerned about where their data is. The idea that most of the vendors and customers have different opinion about the reason for the customer's resistance was the

<http://www.cisjournal.org>

most surprising, and meant that the market did not have matured knowledge about the cloud service.

The customers and vendors views toward the influence of the cloud resistance were obscured and scattered between confidence from the vendors about their abilities to meet the customer's needs and customers must trust their service and try to adapt, to doubts and fears from customers toward the unknown, and lack of trust in the vendors commitment to fulfill their promises to deliver the level of service as agreed in the SLA. However, the interviewed customers had different suggestions to overcome these resistance issues and make the ERP as service more trusted. Some of the suggestions were making joint venture between different suppliers, using penalty point in the SLA to assure the quality of the offered service, or vendors make the service more attractive by addressing it is benefits to the customers. On the other hand, Lawson brought a new idea, by having an option where customers can try products before purchasing called "Test Drive", which we think may reduce the fear and resistance from the customer toward the new system on the cloud if applied by all vendors. Lawson test drive option would address many of the customer's resistance issues as customers can try real products using their own business processes and data that will match the eventual installed product before purchasing and for free. Lawson test drive mainly would address the resistance issue that ERP as service is still unknown and no real example exist in the market, so customers can have a real trial example for 14 days and on their own data and evaluate its value to their business. On the other hand, issues like availability, security, and privacy issues could be demonstrated and tested on real scenarios.

6. CONCLUSION

The product of this research reflect the collected and analyzed views of different ERP vendors and buyers toward ERP cloud service as new way of delivering the system. The summarized results of the conducted interviews were as following:

- All participants agreed about the necessity of SLA as a contract between both customers and suppliers. However, vendors thought SLA is an enough secure contract, while customers didn't think SLA is enough, and more emphasis penalties and checking procedures must be added to assure the offered service.
- While each vendor supported their own case as the preferred ERP as cloud service, customers suggested not to have the core ERP modules initially in the cloud, as they preferred to start with the add-ons modules.
- The interviewed participants from both sides (suppliers and buyers) had different views about the potential resistance from customers toward ERP as service.
- Multi-tenancy still not widely offered as an option, as two of the three interviewed vendors don't offer their ERP services as multi-tenant, and customers as well think that multi-tenancy as a scary option.
- Many surprising issues found from the research, that most of the customers have no experience with any of the cloud services. Moreover, most of the interviewed customers implemented the whole ERP package offered by the

vendors, as none of the interviewed customers benefit from the modularity option.

- Important points emerged from the participants; first, Test Drive option offered by Lawson to let customers try products before purchasing. Second, customers suggested that vendors must show some real examples or business scenarios for ERP on-demand to the market in order to make the ERP as service more popular.

The validity of these results might be affected by many external factors like personal experiences, different contexts, or bias for their own firms. Furthermore, the participants' views demonstrated only one person's view at each organization, which might be affected by the participant personality, age, position, and social background. As most of the participants were from Sweden, the results might be influenced by the Swedish social culture and lifestyle. Hence some of these issues might have different responses if the participants were from other regional or social backgrounds in case these interviews were held within a different market, or even with other personas within the same participated firms. Furthermore, the variation of the views between the suppliers' and buyers', as well as between the suppliers' views, and the buyers' views was driven by many potential reasons, we can brief them by:

- ERP on-demand (ERP as cloud service) market is not matured enough, as there is no ideal accepted definition on the market for it, in addition to many debates about the service requirements, advantages and shortcomings. An alliance group that might drive the researches toward an ERP as service standard might be a goal for the market to achieve.
- The absence of an ideal accepted definition on the market for ERP as cloud service introduced many different variation of the service offered by different vendors, and all claim that their offering is compatible with one of the definitions. Furthermore, no much effort invested from the vendors' side to address the real state of the market, which considered a fault of the vendors not to take a full interest to drive this technology to the light, which stated by the customers that there is a shortage from the vendors that they are not giving this technology enough consideration. It was noticeable that vendors favor their own systems over the customer's needs, as every vendor claimed that their offering is the best for the customers. As vendors were not willing to re-engineer their systems and invest more resources enhancing their systems to meet the customer's needs without a guarantee that it would be accepted and adopted by the buyers.
- Customers don't have matured knowledge about the cloud service, which was because most of the customers are scared of this new technology and how it might affect the already operating ERP system, however, some of the blame might be for the vendors as they are giving it enough attention to make it clearer for the customers. Moreover, most of the customers went through a long tough journey to implement the ERP system until it operated correctly, and they are not willing to go through this cumbersome experience again, as well as they are not willing to risk such a crucial system, and rush into a technology that not matured enough, and not having enough bases. However, most of the customers didn't

<http://www.cisjournal.org>

admit that they are scared from adopting this new technology, and trying to put the blame on the vendor's side.

Finally, as introduced in this study cloud computing has two sides, one contains potentially great benefits, and other side contains many challenges providers must overcome to make this service more trustful, as well many risks customers must worry about before adoption this service. At this time vendors must try to overcome these challenges, and customers will face a trade-off between the benefits and risks of cloud computing. However, a wide believe of most of the vendors and buyers including that cloud computing - like any other technologies trends, abandoned at the beginning, but as time pass, it will become real, which is something has to do with the normal evolution. These days there is a tendency to distrust cloud computing simply because it's new and not well understood, which is directly stated by Bruce Richardson, Chief Strategy Officer, at Infor:

"...I think it will take at least a decade before customers are ready to run all of their applications on a public multi-tenant cloud. I'll bet that most will prefer to run mission critical applications like ERP and financials on premise or in a private, hosted cloud" [19].

7. REFERENCES

- [1] Chung S., Snyder C. (1999): ERP initiation - a historical perspective, Proceedings of Americas Conference on Information Systems; Milwaukee, Wisconsin. 213-15.
- [2] Yen D.C., Chou D.C., Chang J. (2002): A synergic analysis for Web-based enterprise resources planning systems, Computer Standards & Interfaces 24. 337-346.
- [3] Chou D.C., Tripuramallu H.B., Chou A.Y. (2005): BI and ERP integration, Information Management & Computer Security Vol. 13 No. 5. 340-349
- [4] Sharif A.M. (2010): It's written in the cloud: the hype and promise of cloud computing, Journal of Enterprise Information Management Vol. 23 No. 131-134.
- [5] Wikipedia.org, at http://en.wikipedia.org/wiki/Cloud_computing July 13th 2010.
- [6] McKenna C., Cloud and Open Source Enterprise Resource Planning Systems, in the Proceedings of (EEE'11) The 2011 International Conference on e-Learning, e-Business, Enterprise Information Systems, and e-Government, 2011, CSRES Press, USA, pp 294-297.
- [7] Vimalkumar P., Rajamani A., and Jayasubramanian P., Implementation of Erp in Business Process Based On Cloud Computing, OSR Journal of Business and Management (IOSRJBM) ISSN: 2278-487X Volume 3, Issue 1 (July-Aug. 2012), PP 45-50
- [8] Kapil M. and Pratap A., Cloud Computing in ERP Systems, VSRD-IJCSIT, Vol. 1 (1), 2011, 22-28.
- [9] Kiadehi E. F.i *, Mohammadi Sh., Cloud ERP: Implementation of Enterprise Resource Planning Using Cloud Computing Technology, J. Basic. Appl. Sci. Res., 2(11)11422-11427, 2012 .
- [10] Dawson C. W. (2000): The essence of computing projects-A student's guide, Pearson Education Limited, Harlow, Essex, England. ISBN: 0-13-021972-X.
- [11] Klein H.K., Myers M.D. (1999): A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems, MIS Quarterly 23 (1). 67-93.
- [12] Baker H.K., Mukherjee T.K. (2007): Survey research in finance: views from journal editors, International Journal of Managerial Finance, Vol. 3 Iss: 1.11 – 25.
- [13] Stienhans F. (2009): Cloud Computing @ SAP: SAP UK Worldtour, BST Innovation Center, SAP. 1 – 25. SAP Business ByDesign, at <http://www.sap.com/sme/solutions/businessmanagement/businessbydesign/index.epx> July 25th 2010
- [14] Møller C. (2005): ERP II: a conceptual framework for next-generation enterprise systems? Journal of Enterprise Information Management Vol. 18 No. 4. 483-497.
- [15] Westelius A. (2009): The business logic and enterprise systems ventures – the enterprise system as a political tool, 23rd Annual Australian and New Zealand Academy of Management Conference (ANZAM 2009), Melbourne.
- [16] Shapiro C., Varian H.R. (1999): Information rules: a strategic guide to the network economy, Harvard Business School Press, Boston, Massachusetts.
- [17] Dikaiakos M.D., Katsaros D., Mehra P., Pallis G., Vakali A. (2009): Cloud Computing: Distributed Internet Computing for IT and Scientific Research, Internet Computing, IEEE. 10 – 13.
- [18] Callewaert P., Robinson P.A., Blatman P. (2009): Cloud computing: forecasting change, Market overview and perspective, Deloitte Consulting, Belgium
- [19] Richardson B., (2010): Multi-tenancy and Cloud Computing: The View From Infor IT, infor.com, at <http://blogs.infor.com/inside/2010/03/multitenancy-and-cloud-computing-the-view-from-infor-it.html> November 28th 2010
- [20] Adamov A., Erguvan M. (2009): The Truth about Cloud Computing as new Paradigm in IT, AICT 2009. International Conference on Application of Information and Communication Technologies. 1 – 3.
- [21] Kandukuri B.R., Paturi R.V., Rakshit A. (2009): Cloud Security Issues, IEEE International Conference on Services Computing. 517 – 520.
- [22] Maggiani R. (2009): Cloud Computing Is Changing How We Communicate, IPCC 2009. IEEE International Professional Communication Conference. 1 – 4.

<http://www.cisjournal.org>

- [23] Beheshti H.M. (2006): What managers should know about ERP/ERP II, Management Research News, Vol. 29 No. 4. 184-193.

Y. Abuzir was born in Nablus (Palestine) and received MSc. Degree in Computer Engineering in 1991 from Middle East Technical University (Turkey), and Ph.D degree in Computer Engineering in 2002 from Ghent University (Belgium). He is the Dean of Technology and Applied Science Faculty at Al-Quds Open University.

AUTHOR PROFILES

A. Rabay'a was born in 1983 and received BSc. Degree in Software Engineering in 2005 from The Hashemite University, Jordan and the MSc. degree in Software Engineering and Management in 2011 from Linköping University, Sweden . He is Full-time Instructor & E-Learning Specialist in Palestine Technical University /Khadorie, Tulkarm – Palestine.

M. Dweib was born in 1969 and received MSc. Degree in BioM. Engineering in 1994 from Wroclaw University, Poland and Ph.D degree in Computer Science in 1999 from Wroclaw University, Poland. He is full time academic supervisor at Al-Quds Open University in the field of Computer Information Systems at Bethlehem.