



A Study on User Acceptance Factors of ERP Systems in Dubai Business Environment

دراسة حول عوامل تقبل نظم تخطيط موارد المؤسسات في بيئة أعمال دبي

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Abstract

New applications are implemented every day in companies all over the Globe. The majority of these applications do not deliver the promised return on investment due to low user adoption rates. This research is targeting the corporate application implementations in Dubai in terms of studying and analyzing users' acceptance of newly implemented systems. The targeted output of the research is to form a model that will highlight the main factors that affect users' satisfaction, in order to be able to predict their acceptance and adoption rates for ERP projects in Dubai. To achieve this, the research used a case study of ERP Oracle R12 implementation in one of the biggest companies in Dubai.

ملخص

يتم تنفيذ تطبيقات جديدة كل يوم للشركات في جميع أنحاء الكرة الأرضية. معظم هذه التطبيقات لا يحقق العائد على الاستثمار الموعود بسبب انخفاض معدلات الاستخدام لدى الموظفين. يستهدف هذا البحث دراسته وتحليل معدلات قبول الموظفين للتطبيقات والبرامج التي تم تطبيقها حديثاً بشركات دبي. النتائج المتوقعة من هذا البحث هي تشكيل نموذج يسلط الضوء على العوامل الرئيسية التي تؤثر على رضا المستخدمين، للتمكن من التنبؤ بمعدلات القبول واعتمادها بما يخص تطبيع برامج تخطيط موارد المؤسسات في دبي. لتحقيق ذلك، استخدم الباحث دراسة مشروع تنفيذ برنامج تخطيط موارد المؤسسات على أوراكل R12 في واحدة من أكبر الشركات في دبي.

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Introduction

Enterprise Resource Planning (ERP) solutions are business and process management systems that contain integrated sets of applications. These applications can be used to cover all business processes and functions in the organizations. The functionality of these sets is to facilitate the flow of data among different departments and processes, so that processes are integrated in the same system, and data are stored and retrieved from one source. This unification helps in improving the quality of data, enhancing the performance of processes, and reducing the time of the business cycle. The spending on ERP system in the year 2003 was estimated as \$ 66 billion [27]. Therefore, ERP systems are considered the backbone of any advanced organization. ERP market is becoming the largest market in the IT field, and its vendors are the leading vendors in the IT world. [27]

Although lots of benefits are promised from ERP implementations, lots of these promises are not delivered to corporates due to the low adaptability to the new ERP implementations introduced to users. The end-users low acceptance is considered one of the most known reasons of failure. ERP systems prove that technology on its own has no value unless users adopt and accept it. Many internal and external factors affect this acceptance. [10]

Several studies were conducted on end-user acceptance of new technologies. One of the most popular modules that study user acceptance is the Technology Acceptance Model (TAM). TAM model is known to be the most widely spread model that is used in predicting the acceptance of IT and IS systems. The model claims that there are two main factors that affect adoption of users to certain system, which are: 1-The usefulness of this system and how it helps in increasing work efficiency. 2- The ease-of-use of the system, and how user friendly it is. [6]

The success of ERP projects depend mainly on the usage rates. Different factors such as system design, features, implementation and trainings would have a direct impact on increasing users' acceptance and usage. Studying and anticipating the factors that

contribute to users' acceptance can reduce the resistance of end-users and increase the levels of adaptability.

Studying what factors affect users of ERP systems in Dubai business environment is a field that was not covered in many research studies. The purpose of this research is to study the constructs that will impact users' satisfaction with regards to ERP projects in Dubai, in order to form an extension of TAM Model that can be reused in Dubai work environment for similar implementations. In order to come up with a model, a case study was used of a recent ERP system implementation (Oracle R12) taking place in one of the biggest companies in Dubai (Dubai Investment).

This paper contains four main sections. The first section is going over many studies that cover ERP projects success and failure factors, in addition to the different studies about models used to measure information system users' adaptation and satisfaction. The second section provides information about the case study used in this paper in terms of describing the company implementing the product, and the product itself and its features. The third section is covering the methodology used in forming the extended TAM model. The fourth section is covering the result discussion and the final model formed.

Literature Review

The following review is divided into three main parts. The first part has a high level introduction about information systems and implementation risks. The second part is discussing Enterprise resource planning projects. It is highly important to know the nature of ERP implementations and project life-cycles in order to predict the points that have an effect on users' satisfaction. In this section, the paper will be discussing ERP implementations, and how implementation methodology falls under change management theories, in addition to the product selection process that has huge impact on the ERP implementation life-cycles. This section also discusses factors of failure in the ERP project, which is directly related to low usage rates, and it also discusses factors of success of ERP projects in general, taking into consideration the effect of cultural factors and organizational factors on ERP success. Gaining knowledge and attaining information about ERP products and projects can help in having a better insight about the factors that have an effect on the resulted product and its acceptance. In addition, getting exposed to the success and failure factors of other experiences can add up to the constructs of this study in order to enrich the concluded model.

The third part of this section discusses users' acceptance models that relate to information systems in general and ERP systems in specific. In this section, we discuss the TAM model in details, other models of acceptance, and models of setting expectations. In addition, this section also discusses the personal factors related to system acceptance, and the main reasons behind resistance. Knowing what are the factors used in different models will help in identifying the constructs that will be used in this study.

Information Systems

Information systems are places that store processes and use them to deliver useful information to an organization in a way that it can be utilized by employees that need to use it. Information systems might or might not involve the use of technology, however when it uses technology it involves many other factors such as information technology applications, manual processes, knowledge bases, models and databases. From the definition of Information systems, it is clearly noticeable that the most important goal behind their implementation is to generate information for users so they can utilize it. [38]

In information system world, the rates of failures are very high. It is estimated that only 16% of projects end up succeeding and the rest are either cancelled or running over budget or time. The failure of IS projects are divided into four categories:

- 'Correspondence failure', which happens due to not meeting the desired system design.
 - 'Process failure', which happens when a project is overrun in terms of cost or budget, and as a result, either the system is not delivered, or its delivery is not meeting the expected value.
 - 'Interaction failure', which is mainly related to usage rates of the system, in addition to users' acceptance and satisfaction.
 - 'Expectation failure', which happens when the system does not meet the expectations of its stakeholders in terms of requirements, performance or value.
- [38]

Enterprise Resource Planning Solutions

ERP is the most powerful Information system. ERP has gained its popularity because it includes lots of modules that cover the business end-to-end. These modules consist of applications that are mainly covering the financial transactions. It also covers human resource, supply chain, cost accounting, product planning, product manufacturing, sales and distribution, material management, and customer management. For ERP systems to function as desired, the following functionalities should be available in the application implemented:

- Integrate processes across the organization and across different locations of the organization, and automat these processes in the system.
 - Implement the business processes as per the best practices, and conduct them targeting productivity improvement.
 - Distribute and share practices across the whole organizations to reduce the error rates.
 - Generate and provide real-time reports in order to take more accurate decisions.
- [27]

IS systems are either custom made applications that are tailored to fit the business processes, or off-the-shelf applications that have standard processes. The first option usually is time consuming, expensive, and has maintenance overhead. ERP solutions are off-the-shelf solutions that have their own embedded way in implementing business processes, with minimal customizations. Therefore, ERP systems are not only considered software packages, they are a comprehensive software infrastructure that affects all the functions, and sometimes imposes changes on the way things are done and on the culture of the organization. [27]

ERP systems have more than 100 providers around the world. However the most famous and controlling vendors are called the 'Big Five' and they acquire 70% of the market. These vendors are: SAP-AG and they acquire 33%, Oracle and they acquire 18%, Baan and they acquire 12%, JD Edwards and they acquire 5%, PeopleSoft and they acquire 1%, and the rest of vendors get 31% of the market. [27]

ERP systems are very important in modern business organizations. They have many tangible and intangible benefits. The tangible benefits are the benefits that can be measured, such as improving customer service, reducing cost, increasing productivity, and reducing cycle time. Intangible benefits are things that cannot be measured but are important in the long run, such as competitive advantage sustention and business growth support. The common practice of ERP system usage is that they remain utilized for a long period of time, which allows the organization to take advantage of all the benefits that affect the company either in a short run or in a long run. [20]

ERP implementations

ERP system implementations are usually encountered with lots of difficulties; these difficulties might have high impact and lead to the failure of the whole implementation. One of these difficulties faced in the implementations is the complicated technology that needs large enterprise environment to function as desired. Small companies implementing ERP solutions might not achieve the return on investment desired, or in the contrary, it might complicate their processes in an unneeded way. Another reason of failure would be the gap between business needs and the processes implemented in the system. The system might have automated some processes that do not add value to the business, and do not improve productivity.

A failure might also be caused due to the clashes between ERP processes and business processes, especially that ERP systems are off-the-shelf products that have minimal customizations. Business processes should be flexible enough to accept the changes as per the new system practices. However, changing the business completely as per the system process can cause the loss of the competitive advantage of the organization in the market, and the loss of product's uniqueness, especially that the same processes will be implemented by all organizations that use the same ERP system. The right balance of choosing the appropriate modules and customizations in ERP systems from one side and making certain compromises in the business

processes from the other side should be applied in order to have a successful project.
[5]

Change Management

ERP implementation is a type of change that affects the organizational level. According to Todnem (2005), changes are situations that are always occurring; therefore they need to be dealt with in the right way to guaranty the survival of the organization. Although Organizations are aware of the importance of managing changes properly, 70% of changes end up being a great failure. [30]

In order to know how to deal with the ERP implementation, it is beneficial to know what type of change it is, and in which category it falls. Todnem (2005) in his article classifies changes into different types according to different categories. Change can be categories by:

- 'Rate of Occurrence': how often the change happen
 - Discontinuous change: a change that takes place once, all in the same time. It is known as a rapid shift in the organization.
 - Incremental Change: this change happens gradually, and it occurs on the organizational level. It happens in a phased way, where every step is planned and agreed upon.
 - Continuous change: it is a change that happens more often, and it occurs on the operational level only.
- 'how it comes about':
 - Planned Change: the change should have a proper plan of implementation that involves three step approach; unfreeze the current situation, move to the new situation, freeze the new situation.
 - Emergent Change: this type suggests that a change should happen so quickly that it cannot be planned for. In this approach, the responsibility of the new change should be decentralized.
- 'Scale': it divides the change based on its impact.

- Fine-tuning: it mainly happens on a personal or group level.
- Incremental adjustments: non-radical changes on the process or strategy levels.
- Modular transformation: big change in one of the business units.
- Corporate transformation: radical changes on the corporate level. [30]

From the above description, it is clear that ERP implementations should be considered as planned change in terms of the 'how it comes about' category. In addition, it is a corporate transformation, when it comes to its scale. With regards to the 'Rate of Occurrence', management should decide if they want to go for the phased approach (incremental change), or with the one big bang launch (discontinuous change).

ERP Product Selection

One of the major risks that are faced in ERP projects is the wrong selection of the right product. Wrong selection impacts users' adaptability since it affects the ease of use and the usefulness of the system. ERP Projects should be treated differently than normal IT projects, since it involves all functional departments of the enterprise environment. In normal IT projects, the main driver of initiating the project is the financial advantages. The normal initiation process compares the costs of the new implementations, versus the financial benefits of the system. However, in ERP selection, the process should be studied very well since the cost implied on the project is too big to be at risk. The most common scenario of ERP implementations is the formation of a committee that includes representatives from each area that is covered in the application, in addition to the key users and influencers, and IT staff and project managers. [15]

The methodology followed to select the application should take into consideration the business processes and the product's outcome, in addition to the normal software criteria of selection such as user friendliness, functionality, cost, and implementation time. The process starts with planning, followed by product search, followed by selecting a product, followed by evaluation, followed by negotiation and then choice. During this process, in normal system selection, the main driver is the financial calculation such as

the return on investment (ROI) and cost-benefit analysis. In ERP projects, the ROI fails to measure lots of qualitative factors that are mostly needed in the success of the project. Lots of intangible factors that have no impact on the financials are very critical with ERP implementations. Requirement gathering process should have great impact on the selection process since it takes users' need into account. Karaarslan & Gundogar (2009) Proposed taking the following criteria in the ERP selection process to cover the financial and non-financial aspects:

- Fitting the strategy of the business.
- Technology used
- Change management process
- Implementation feasibility
- Risks
- Serving the business processes
- Vender reliability
- Flexibility of the application and implementation
- Cost
- Benefits [15]

Factors of Failure

Failures are common in ERP projects. Only 10% of ERP projects finish within budget and on time. 55% of the projects overrun either their budget or their plan. 35% of the projects end up being totally cancelled. In cases of failure, customers and vendors start a blame game. However, most of the times it is neither the customer nor the vendor that is the reason of the failure. The main reason would be overlooking one important step in the project which is fitting the business process to the ERP processes. Overlooking this step has many implications, one of them is a great loss of money, and another one is a great loss of business opportunities that might have been gained in case if the system was implemented. Some organizations choose to buy a technology and spend lots of money, and then they are forced to crush their processes to fit the system. However, the only way for these projects to succeed is to go through a

business process reengineering, and then customizing the appropriate technology to fit their needs. [3]

The main steps to plan a successful project are; to have proper requirement definition stage, followed by a developed plan, followed by the implementation. During the requirement definition stage, requirements related to functionality should be clearly identified and optimized as per the business process. [3]

The main reasons behind ERP projects failure can be identified as:

- Concentrating on the solution: implementing the best technology is not enough to make a project a successful one.
- Ignoring the requirements definition phase: this can lead to either squeezing the business process to fit a technology, or relay on a technology that is not designed to serve the business. And in both cases, the business is losing the value behind implementing an ERP.
- Bypassing the process by jumping from requirements definition to the implementation: it is very important to go through the proper process by establishing a strong plan. The target should be to build a business solution rather than a technical solution. [3]

The right and optimal solution to these problems is to have a third party consultants evaluating the business processes and adjusting them to have the best fit between the business and the technology. It is recommended to have a third party that has no interest in the other aspects of implementations. Putting the right process in place will increase the perceived usefulness from the system, which will directly impact its usability. [3]

One of the most famous stories about ERP failure that caused a bankruptcy to one of the biggest pharmaceutical companies is the FoxMeyer case. This company was implementing SAP ERP system and then expanded it to warehouse automation. It hired Andersen as a consultant to design the integration. One of the main problems faced was the resistance of the employees of warehouse to use the new system. This caused

a big ethical problem, in addition to other usability problems. The system was not ready to handle big amount of transactions, and users were not able to operate properly. [26]

The project was a disaster because of many factors explained below:

- Project Factors: it was noted by FoxMeyer that Anderson have assigned the task to the inexperienced consultants, and SAP was taking their implementation as a training lab.
- Psychological factors: FoxMeyer management was emotionally attached to this project, and spent a big amount of money in order to perceive a bigger benefit on the performance level. However their spent was more than they could handle and it ended up reducing their margins and their profit.
- Social Factors: although it would have been a very good decision to reduce the scope of the project, this decision was not taken, because of the big negative impact it would have had on the publicity of the company.
- Organizational Factors: a change in management occurred in FoxMeyer during the advanced phases of the project life cycle. The new management was in need to reduce the scope. However it was too late to do this step. [26]

This project should have been treated differently. A definite reduction in the scope should have been done, or a phased approach should have been followed. A phased approach would have helped in-house employees to gain the technical knowledge needed to control the project in a better way. In addition, enough time would have been given to test the transactions volume against the system capability. The processes of the system should have been reengineered to suit the system's capacity. Proper audit on the project scope, timeline and budget should have been performed. Finally, conducting proper trainings and involving users in the design stages would have reduced their change resistance. [26]

On the other hand, another implementation of ERP project was conducted in university in Saudi Arabia. The ERP system that was used is R12 Oracle business suite. The implementation was a big failure due to the low response and usage rates in the

university. The university has invested an amount of 230 million SAR. Only 12% of the functionality was utilized, which is only worth 27,600,000 SAR, and as a result, the loss is worth 202,400,000 SAR. In addition, it is estimated that the functionalities would only cost 500,000 SAR if it was not implemented through the ERP system. The failure of the system is mainly due to ignoring the proper gathering of requirements and system requirement specifications. Another reason for the low usage rates is the mismatch between the system design and the actual processes. Finally, in this type of business, the big-bang approach is not a very smart choice. A better choice is to go with the phased approach with the most important functionalities first, and get users to adapt to it incrementally. [39]

Factors of success

Lin (2010) in his research claims that the main two factors that affect the success of an ERP project are the information system quality, and the top management support. Information system quality and preserved usefulness have a direct positive impact on users' satisfaction. Increasing perceived usefulness and satisfaction, along with top management support will directly lead to increasing the usability of the software, which is the main indicator of the success of ERP system. [20]

Information system quality is mainly dependent on two factors; information quality, and system quality. Information quality measures the overall quality of the information generated from the system. These measures include presentation format, completeness, accuracy and currency. On the other hand, system quality measures the factors that affect the functionality of the system. These measure are; system accessibility, integrations, response time, reliability, and flexibility. [20]

The other factor that is very important for the ERP systems' success is the top management support. One of the reasons why IT systems might have poor return is the low level of involvement from senior executives in IT applications. In ERP specifically, it is highly important to get their involvement and support since the application is mainly about breaching the gaps between the business processes and the application

package. ERP implementations involve many parties in the organizations such as, technical, operational and organizational parties. The quality of the system is not enough to determine the success of the project. High management support must be provided to reach to the ultimate results desired. Their support is required in the following points:

- ERP implementations involve many changes in the business processes. Unless top managements provide their support to the implementation, lots of resistance will be faced from processes owners.
- ERP packages can be misaligned with the wide range goals of the organizations. Top management should interfere to resolve this misalignment.
- Implementing ERP projects needs effort and dedication from qualified resources from different fields. Top management should facilitate the availability of their resources during the life-time of the project.
- Although top management cannot force users to be pleased of the new ERP implementation, their noticeable support can encourage employees to have a positive perception about the system. [20]

One of the main factors that affect users' acceptability of the system, and project success accordingly is users' involvement in the development process. Discussing users' opinions, assigning tasks to them related to the project, and showing interest in their behavior help in encouraging their psychological involvement state in the project. One of the ways to get users involved is to train them on the system; however it does not provide enough involvement to put them in that psychological state. Their participation is required on a greater level. Going through the implementation process would make users even feel more excited to participate in new IS projects. Furthermore, feeling psychologically involved has a positive impact on their attitude, their acceptance, and their usability. [24]

ERP implementation process

In order to avoid system failure, the process of implementation followed in the project should be studied very carefully. One of the models that provide detailed approach for ERP implementation is called 'the implementation and performance stage model'. This model contains the following stages:

- 'Initiation': in this stage, the decision to acquire the solution and the need to change is specified. In addition to other factors such as top management vision, the need of connectivity, and incompatibility.
- 'Adoption and adaptation': this stage is concerned with pre-implementation issues such as the cost and benefit analysis, technology selection, and investments decision.
- 'Acceptance and reutilization': this stage is mainly focusing on the implementation of the system and the performance of it. The factors that it concedes are: process integrations, flaw correctness, training, integration with different units, system modifications, enhanced performance, and user acceptability. It is very important to make sure that users are not using workarounds in the system since this is too costly in terms of spending double the effort and double the time needed to finish the business cycle.
- 'Infusion': this stage is concerned with future enhancements. [22]

These stages are closely integrated with the process of the 'project phased model (PPM)' which include three phases; planning, project, and enhancement. This approach actually includes the initiation, adoption and adaptation phases in the planning stage. The main two elements that are mostly important in this stage are the preparation and the training. [22]

- Preparation: this process dictated that business processes should be closely studied among different functions. The compatibility between the system and the processes should be carefully investigated before the implementation to reduce the chances of money loss. On the other hand, Proper preparation will result on a better system performance.

- Training: this factor is very critical and has a big effect on the success of the project. It helps in increasing users' participation and contribution in the system with regards to the processes and activities implemented, and it also helps in enhancing the system by acquiring the users' feedback into the system. [22]

The project stage includes the acceptance and reutilization stages, and it is divided into two major stages; transition and performance. The purpose of this division is to recognize the factors that contribute into the success of the project and address them in a better way. It is very important to address the transition period to the new system with a detailed well-studied plan. On the other hand, performance is concerned with high-quality and accurate output in a fast response time. [22]

The last stage 'enhancement' includes the 'infusion' stage and it is directly related to after implementation modifications. ERP solutions are based on packages, which are known in decreasing the time and effort of enhancements since it reduces system complexity. Thus, system enhancement and maintenance should be minimal compared to traditional system maintenance. [22]

Most of current literatures focus on the pre-implementation and implementation stages of ERP projects. However, post-implementation phase is very important to evaluate the implementation, to know the success factors of it, and to measure acceptance. According to Gattiker & Goodhue (2005), it is very important to measure the impact of ERP implementation in intermediate level, and then sum it up to reach to the overall impact of the implementation on the organization. The overall benefits received on an organizational level are only acquired because subunits have received these benefits. However, these subunits differ in terms of the positive impact ERP has brought to them, and in terms of their acceptance. It is argued that the more interdependent the unit is, the more advantage it will get from the ERP system. These advantages are; better data quality, more efficient business processes, and better interaction between different subunits. Each unit will have a benefit out of the new system. An example would be closing the accounting books with less effort and time. This advantage will impact the whole organization and can be considered as an overall global advantage. [11]

Furthermore, ERP systems are long-term systems. Therefore, their acceptance might increase with time, and their positive impact on a company can only be harvested on the long run. The first stages of the implementation are not very fruitful, till the system stabilizes. Stabilization includes the period where users adapt to system processes, or certain customizations are made on the system to match the organizations processes. These customizations can be either core ones, or non-core ones. After the stabilization period passes, which is usually known to be in the first year of implementation, organizations start to notice the improvements on their subunits, which usually happen in the second year of implementation. Time elapsed since ERP implementation is another important factor that should be considered when benefits of ERP systems are evaluated. [11]

The effect of culture on ERP success

Since ERP system are package based solutions, it consists of certain social elements that formalize the business processes of the system. These processes represent the business culture that the system was designed within. During the design and implementation phases of the system, people from certain culture decided on how things should be done. Given that the implementation of the system is separated than the place of use of the system in terms of culture, place, and time, it is highly expected to have a cultural 'misfit' between the processes in the implementer organization and the processes design in the country of origin in the ERP system, specially that the design of ERP solution is a people's implementation not a technological implementation. [36]

This misfit between processes might have a great impact of the quality of the ERP system, and accordingly on user's acceptance rates. However, the following factors can work to the benefit of the implementation to solve this misfit:

- External factors:
 - o Country of origin of the ERP system: ERP Global vendors are trying to make generic ERP systems that can fit all cultures and serve all users.

However, this design will not have the capability to accommodate the local firms' processes and customizations. Thus, the best solution for this problem is to perceive the implementation from a local ERP package. Local companies will be able to offer high customizations to compete with big branded solutions, which improves the quality of the system implemented and reduce the misfit.

- High quality consultants: local consultants can perform as mediator between the local company and the foreigner systems, to make users better understand the processes of the system. Certain agreements and reasonable compromises can be suggested by good consultants and developed in order to make the processes fit the needs of the business.
- Internal Factors:
 - Top Management support: management should be aware of the amount of investment they are doing by obtaining the ERP solution, and their support can impact the culture of the organization.
 - User support: the users should be very supportive in order to reduce the misfit. They should have a positive attitude towards the system, they should be willing to contribute in the formation of process of the system, and they should show flexibility towards the changes that the new system will bring. [36]

The effect of organizational factors on ERP success

ERP implementations success or failure can get affected by lots of factors that are internally related to the organizations' built up. The contextual factor of the implementer organization needs to be taken into consideration in order to minimize the chances of project failure, and increase the changes of users' acceptance. The following are some of these factors:

- Firm size: the size of the firm is measured by its number of employees, and its annual income. Small companies have less than 50 employees, and their annual

income is less than € 10 million. Medium size companies have less than 250 employees and their income is estimated to be less than € 50 million. Other than these two categories, the company would be considered as a large company. It is claimed that large companies receive more benefits out of ERP implementations, thus it work better for them. In addition, small companies might not bear with the cost of implementing ERP system or supporting it. Therefore, big size firms are more likely to have a successful project.

- Organizational culture: the culture in an organization is defined as the way things are implemented inside that organization. It is mainly a set of impressions, habits, rituals, and internal rules that are assumed to be right. These cultural habits affect the behavior and reaction of employees towards how work should be done and how they adapt to new technologies. This culture can easily mismatch the ERP processes which can cause a problem during implementation. If the processes match the culture of the firm, this will most probably lead to the success of the project.
- Organizational structure: the structure of an organization is a hierarchy that has labels to define the main roles of that organization. The way the organization is structured emphasizes the following characteristics: centralization, specialization, and formalization.
 - o Centralization: is related to the decision making process. If the authority to make a decision is only kept with the top management then the organization is centralized, otherwise it would be decentralized. ERP implementation supports the 'command and control' structure, which mainly benefits the top management.
 - o Specialization: which emphasizes that one job should be divided among many employees, based on their specialization. ERP would function in a better way in specialized firms and would be more effective.
 - o Formalization: is the extent of following formalities and having a documented rules and procedures that are well-known by all employees. In ERP implementations, the more rules are followed and documented the

easier the implementation would be and the higher the output of the system.

- IT assets: it refers to the IT staff of the organization and their technical knowledge and experience, in addition to the relationship between IT department and the business. This factor is one of the most important factors that affect the ERP success. High qualifications of in-house IT staff are required for a successful project.
- IT resources: it refers to the size of the IT department in the organization. Large firms tend to have mature IT departments with a reasonable size, unlike small firms. The more resources available for the project the more likely the project will succeed in its implementation, issue fixing, maintenance, and upgrades. [14]

In order to implement a successful ERP implementation, and increase its perceived usefulness, and accordingly users' satisfaction, it is highly important to have a good methodology of knowledge sharing implemented. Processes in any organization can be divided into two types. The first type is 'Canonical processes', which are processes that already documented or implemented in the current system. The transfer of this process type is straight forward since it is an explicit knowledge. On the other hand, the other process type is the 'Non-canonical processes', which is the actual processes that happen informally in real life activities, and is controlled by interpersonal communications. This type of processes is considered as a tacit knowledge, therefore it is tricky to be transferred. Obtaining this tacit knowledge in the system is what gives the implementation its value added over other ERP implementations, that is why it is highly important for these processes to be captured from the people that perform them in different divisions. [31]

Users of the 'Non-canonical processes' can show resistance in sharing the information related to the processes. This problem can be handled by applying changes in the following two factors: 'the structure of team interaction', and 'the atmosphere of the team'. The structure of the team depends on many factors such as the hierarchy of the team, and the way the team is seated. The atmosphere of the team depends on non-tangible factors that affect the willingness of the team to interact and share knowledge,

and the intimacy of the individuals with other team members. These two factors can be influenced by the management of the project. Forming teams that have structures according to the processes can have a direct impact on the structure. Having an encouraging working environment for the teams and inviting them to off-site meetings can be beneficial in the teams' atmosphere. [31]

Li (1997) in his research stated that there are some factors related to IS Department in an organization contribute directly to the acceptance of information systems. The following points explain the factors in addition to their sub-factors:

- Quality of information system (IS) services received:
 - The improvement of users' knowledge about the system.
 - The friendliness and skills of the IS staff.
 - The efficiency of system related services.
- The conflict resolution between IS staff and business users:
 - The distribution of organizational resources between IS staff and users.
 - The availability of technical information for different department users.
 - The professional relationship between the IS department and the business departments.
 - The authority of the IS department.
 - The control users have over their computers and the IS used. [19]

User Acceptance Models

There are two main goals behind implementing an ERP system; to automate business processes in order to implement work in a more effective and efficient way, and to guaranty the availability and accuracy of data and information that are related to business processes. However, these goals cannot be achieved unless users perform their work related activities using the system, which is the main measure of the success of the system. [10]

Accepting the system includes accepting it by attitude and accepting it by behavior. Based on this, users can be divided into 4 types:

- 'Convinced Users': users that accept the system in attitude and in behavior. This type of users has no problems in acceptance and will easily adapt to the system.
- 'Unconvinced Users': users that do not accept the system in attitude and in behavior. This type of users rejects the system completely.
- 'Frustrated Users': are users that accept the system by attitude, and rejects it in behavior. These users cannot use the system implemented, however they have positive intentions towards using it. These users can be moved to the 'Convinced Users' type by making them more familiar with technological benefits on business process and 'business informatics' concepts in general.
- 'Forced Users': are users that reject the system by attitude, and accept the system in behavior. These users perform the activities required from their side, but they do not feel good about it. these users can be moved to the 'convinced users' type by presenting to them the features and automations implemented by the system and making them more familiar with the system. [10]

Based on the categories above, training of the following types should be provided to ERP users: the first should cover the automated business processes without relating it to any system, the second should cover the system documentation without specifying detailed business processes, and the third should combine both, business processes and how to implement them on the specific system. [10]

In a research done by Wallace & Sheetz (2014), they claim that in order to understand the reasons why users accept certain software, it is important to set some measures to increase its use within the organization. It is also needed to improve these measures in order to make them more accurate. They used TAM as the base to their research theory. They clarify that the technology can be adopted if users are convinced that the technology helps them to perform better in their jobs, and if the technology does not require them to increase their effort in a physical or a mental way. TAM was built based on the theory of Reasons Action (TRA). The theory states that people perform intentions about new behaviors. These intentions are formed based on their predictions of the consequences of this certain behavior. The TAM theory extended this to the use of technology adoption. [35]

Despite the fact that the TAM theory is very powerful, Wallace & Sheetz (2014) claim that identifying what makes a technology useful is the most important factor of investigation. The functionalities that users consider as useful are the functionalities that should be focused on and should be implemented in the software in order to increase user adoption. Studying these aspects is what brings the theory to practical implementation, and what makes the results useful for repeated implementations. [35]

As per Wallace & Sheetz (2014), the following factors should be considered as 'sub-dimensions'. These sub-dimensions will extend the TAM theory to evaluate the technology perceived usefulness measures:

- 1- 'Language Independent': The usefulness measure should be programming language and technology independent.
- 2- 'Prescriptiveness': it should not only detect, it should also propose and advice.
- 3- 'Validity': the measure should be valid and tested.
- 4- 'Life Cycle Application': it also should be applicable on all stages of the Software development life-cycle.
- 5- 'Ease of use': although in TAM it is a separate measure, in this research it is also considered as one of the factors that affect functionality usefulness. [35]

Theory of reasoned action (TRA)

This theory is a social psychology theory that studies the 'concisely intentional behaviors'. According to TRA, the person forms an intention for his behaviors which is called 'behavior intention'. This intention is performed by two factors; First, the person's attitude, which is the users' silent belief towards performing the behavior and what consequences might occur; And Second, the subjective norm, which is the users' perception of what people that are important to him think he should perform. This theory is a general one, and it does not have specific elements that relate it to a certain field of study. Applying it to the information system behavior will not be comprehensive since lots of factors related to the technology would be totally ignored although they have great significance. [6]

Technology Acceptance Model (TAM)

TAM proposes TRA theory but in a specific way that suits the information system field. The main goal of the model is to define the factors that impact users' acceptance. Its main purpose is to study the external factors that affect users' internal believes. This module got so popular because of its simplicity especially that it helps in predictions, and also in the analysis of the reasons of why the system was not adopted by users. The main two factors that this module depends on are; the 'Perceived usefulness' which is the users believe that using this system will make him perform better; and the 'perceived ease of use' which is the users believe that the system will be free of effort. Both factors in the TAM model are directly related to information systems' usage and that is why it is heavily used in the IT world for studying users' acceptance. [6]

Technology Acceptance Model (TAM)2

TAM theory was extended to include more factors that affect the perceived usefulness of a system. The extension of the theory is called TAM2. This new theory focuses on the usefulness of the system and how users perceive this usefulness. One of the most

important factors in users' perception of usefulness is the 'Social Influence'. The following are the main factors that affect users' social influence:

- 'Subjective Norm': this factor is determined by the user's perception on what other people that are close to him or her believe he or she should react. This has a major impact on the users' reaction, since the user at certain times can perform a behavior that he or she does not favor.
- Voluntariness: this factor measures the users' attitude towards a system based on the consequences of using the system. Users that use the system as mandate from their work react to it differently than users that have the option not to use the system. People that use a system voluntarily tend to have better impression about the system.
- 'Image': other people's impression about the system has a major effect on the users' impression. Since employees interact socially in the work place, side discussions about the new system might impact the impression of a whole group of users. [32]

Studies show that the social influence factors have minimal effect with time as users gain more experience with the system. In the early stages of the system, users will depend on the social influence factors to build an image about the system, especially that they have not used the system yet. After users are introduced to the system, and after they gain more knowledge of its features, they tend to build their own impression about it, which minimizes the impact of social impacts. [32]

The second main factor the TAM2 considers it to be one of the main players in perceived usefulness which is the 'Cognitive instruments'. Since humans by nature evaluate the instruments they have in hand by their usefulness to reach the goal desired, information systems will also follow the same human trend in their evaluation. The more the system helps users achieve their targets, the more they consider it useful. The following points represent the main factors that affect the cognitive instruments:

- 'Job Relevance': the system should be perceived as a direct add-on to the users' goals. It should be related and relevant to the tasks they perform. Having a

system that is directly related to work goals and tasks and has a major involvement in their day-to-day activities, would have a positive impact on the users' perception of the system.

- 'Output Quality': this factor measures how accurate and efficient the system performs the task. Users do not only require the system to implement a task that is related to their goals, they also require the system to implement it correctly. This factor is one of the major factors that affect the image of a certain system and have a direct positive effect on perceived usefulness.
- 'Result demonstrability': users tend to have more positive impact toward systems that can help them perform in a clear way. If the benefits of the system are not visible to users, they will not be able to have the right perception about the system or its perceived usefulness.
- 'Perceived ease of use': this part is inherited from TAM. It states that the easier and effortless the system is, the more useful it is considered. [32]

In the above mentioned factors related to 'Cognitive instruments', none was proved to change its impact over time. Users will remain focused on the job relevance of the system, the quality and the demonstrability of the results. Gaining more experience in the system will not change the way they perceive the system with relation to these factors. However, their perception of the ease of use can change with time. As they use the system more, they can gain more knowledge on how to use it, which will change their impression on how easy it is to be used. [32]

Personal factors affecting acceptance

TAM predicts users' acceptance of a certain system by studying the factors that affect their intention to use it. Users' intention can also be affected but some personal qualities that each user have. These personal factors are not taken into consideration in TAM and should be considered. Some technology related personality factors have impact on technology adoption, such as oral and written communication skills, computer tenseness, and personal innovativeness. [28]

Some qualities such as extraversion and agreeability can have a positive impact on the users' appeal to use a system. Extraverts tend to use social applications more than introverts, which indicates that extraverts would evaluate the usefulness of a system differently, thus they will have a better intention to use it. Some factors might have a contradicting impact on usability depending on the service under study. An example from the internet use trends would be the emotional stability. People that are emotionally unstable tend to use internet more for shopping activities such as buying and selling. On the other hand, emotionally stable people use the social application more than unstable people. [28]

Another factor is affected by personality, which is the evaluation of the technology. People that are known for being optimists tend to evaluate systems in a better way, expect higher value and usefulness from its functionality, and find it easy to use. In the same area, people that are known for agreeability are expected to give the system higher ratings out of being kind and friendly. [28]

On the other hand, other personal characters have big impact on the attitude of a user towards a new system. According to Wang & Yang (2005), some traits are very important to be considered in the acceptance process. One of these traits is 'Conscientiousness', which defines a person that is a hard-worker and responsible. These people tend to be authoritative as well as self-disciplined. These people tend to believe that they perform very well in their jobs and therefore set high expectations from the system. [37]

Another personal trait that is very important is 'Neuroticism'. These people tend to be nervous, easy to get afraid, angry, and unstable. They tend to be removed from their positions, and sometimes removed from the whole organization, before their performance trend is studied. [37]

In addition to the above, 'openness', is another trait that affects the acceptance of users. Users that are known for their openness, they have exposure and curiosity to other cultures and experiences, and that is why it would be much easier for them to adapt and accept new technologies and systems. [37]

TAM's factors can have different weight of importance depending on the type of user using the system. Users of information systems are divided into two main types as per Sánchez-Franco & Roldán (2005). The first type is the 'experimental', and the second type is the 'goal directed'. Experimental users are users that navigate through the system to see what it can offer. These users usually care about factors that do not really involve the usefulness of the system, such as the look and feel and the ease of use. However goal directed users are users that access the system for a purpose in mind and a certain functionality to accomplish. What they mostly care about is how the system would serve their needs, which is the system usefulness, and this will make them tolerate a bad interface or ugly design. [25]

Reasons behind Resistance

User resistance in the Information system perspective is defined as the users' objection to change with related to a new application implementation. The resistance is usually an output of interpersonal characters affected by external factors, and interacted with other social influences. Resistance can be a result of an expected threat, as the new system will be perceived as the new threat. A process model of the resistance was formed based on the following factors: first step is the initial condition, which is the new system with its new features. Through the second step which is interaction process, where features are communicated to users, which might lead to the formation of the perception of threat (third step), which comes as a result to the loss of power, and thus formulates a resistance behavior (final step). [16]

One of the models made to study users' resistance behavior is the 'Equity-implementation model (EIM)'. In this model, the users' evaluation is mainly studies according to the net equity. The net equity can be calculated as shown below:

Net Equity = change in outcome – change in inputs

Change in outcome = increase in outcomes – decrease in outcomes

Change in Inputs = increase in inputs – decrease in inputs

Based on the above calculation, users form their resistance behavior. EIM proposes the 'cost-benefit analysis' of changing to the new system. The cost is the decreased outcome of the system and increased input. An example of the decrease in outcome would be previous work loss, and the increase of input would be more effort and time needed to accomplish a task. On the other hand, the benefit is the increased outcome and decreased input. An example of the increase in outcome would be better system quality, and the decrease on input would be reducing the time needed to perform a task. [16]

In some cases, users chose not to use the new system, and not to switch to another one. This action was explained in the theory of 'Status Quo Bias (SQB)', which explains that users are always biased towards keeping their current status quo. Being biased towards the current status might have many reasons behind it such as:

- 'Rational decision making': in this case the user takes into consideration the cost of switching to the new system and the time it will take him to learn it. Although he or she might be aware that the new system offers higher value to work and better features, however he or she still thinks that the cost of switch will be too high because of his or her lack of knowledge in the new system and his or her minimal experience.
- 'Cognitive misperception': in this case the user takes a decision not to switch because he has a perception that the losses in switching will be too high. Although in reality, the cost is not high and it is minimal compared to the gains of acquiring the new system.
- 'Psychological commitment': this commitment to the old system might be based on incorrect factors. These factors might be the desire to stay in control, or to keep a certain social position, or to try avoiding regret from an unknown new system. [23]

When the status quo is rigid and unchangeable, then it is that state of 'Inertia'. The definition of inertia is to remain attached to the current system; even if it is clear and obvious that there might be better options. Inertia does not take into consideration the new system. It refuses to change the current system regardless of the other options.

Inertia can easily be recognized if the new system is totally ignored. Users can reach this state because of the following:

- 'Behavioral-based inertia': this means that users will just use the current system because this is what they have always used.
- 'Cognitive-based inertia': this case when users choose to use a system that they know it is not the best option available, and they know there would be better systems.
- 'Affective-based inertia': in this case, the user continues to use the system because it is less stressful. Thus, he or she prefers to stay in his or her comfort zone without doing any changes. [23]

It is worth mentioning that not all rejection cases are due to the (SQB) or to inertia. Some of the users are not aware of the better options available, and some believe that the currently used system is better than the new one. In these cases, there is an intention in continuing the use of the current system. Low adoption can still happen due to deficiencies in the new system, such as being hard to learn, not being accurate, users are not qualified enough to learn the new system, or they did not get proper training. In these cases, inertia will be low and intentions of not using the system will be high. [23]

Venkatesh, Thong, & Xu (2012) in their article argue that another factor is very important on the technology use which is the habit. Habit has a direct effect on technology use, and it also weakens the influence of behavioral intention. The habit obtained from previous use of technology has a direct effect on the use of the new technology, and sometimes it can have higher impact than intention. Habit is formed from repeated act of a certain behavior. Once a habit is formed, the intention and attitude will unconsciously form the behavior without the need of any mental interpretations. The habit is only formed if this behavior was done repeatedly and it has to be performed over a long period of time in order to overwrite other patterns of behavior. This has a big impact on any adaptation process of a new behavior. Habit is known to be easy to change among younger people than older people. It is also known

to be easier to change among women than men, since men do not stay alert to details. [34]

Other Models of acceptance

Many models were used in the information systems acceptance studies other than the TRA and the TAM. The following are other modules that are used for the same purpose:

- 'Motivation Module (MM)': this theory is used in information system studies to understand systems' adaptation, and it has the following constructs:
 - 'Extrinsic Motivation': to motivate users to use the system by tempting them with other factors other than the output of the system such as performance, promotion, or pay.
 - 'Intrinsic Motivation': to motivate users to use the system by only presenting the processes supported by the system and its outcomes. [33]
- 'Theory of Planned Behavior (TPB)': this module is an extension of TRA with additional constructs, the following are the main factors of this module:
 - 'Attitude towards behavior': this factor is taken as is from TRA and it represents the user feelings towards the system wither they are positive or negative.
 - 'Subjective norm': it is taken from TRA and it represents the users' perception about the important people around him and their thoughts of what behavior he or she should perform.
 - 'Perceived Behavioral Control': in the context of information systems, this factor is related to the perception of internal and external limitations on behavior. [33]
- 'Combined TAM and TPB': this model is a hybrid one that combines the constructs of TAM and TPB. The following are the constructs used:
 - 'Attitude towards behavior'
 - 'Subjective norm'
 - 'Perceived Behavioral Control'

- 'Perceived Usefulness' [33]
- 'Model of PC Utilization (MPCU)': the purpose of this module is to predict users' behavior rather than their intention, and it was mainly used to predict PC utilization. The constructs of this module are:
 - 'Job-fit': the users' belief that the system will enhance their work performance.
 - 'Complexity': the perception on how much the benefits gained from the system are easy or difficult to understand.
 - 'Long-term Consequences': things that will be considered as future drawbacks.
 - 'Affect towards use': different feelings that users have for the system, wither it brings pleasure or displeasure.
 - 'Social factors': the effect of the surrounding social groups on the individuals.
 - 'Facilitating Conditions': the factors that facilitate the use of the system such as support. [33]
- 'Innovation Diffusion Theory (IDT)': this module studies the individual acceptance of technology using the following constructs:
 - 'Relative advantage': the degree of innovation perceived from the current technology versus the previous one.
 - 'Ease of use': the perception of the innovation perceived in terms of how easy to acquire.
 - 'Image': the perception of wither using the innovation will improve users' image in the users' social environment.
 - 'Visibility': the factor of wither the user can view other users using the system or not.
 - 'Compatibility': the factor of wither the current system is serving the current needs and values, and taking into consideration the past experiences or not.
 - 'Results Demonstrability': the ease of results generation and communication, in addition to the clarity of benefits gained.

- 'Voluntariness of use': the factor that presents the users' choice to use the system, and the amount of freedom the user has. [33]
- 'Social Cognitive theory (SCT)': one of the most powerful modules of human behavior that was extended to be implemented on information systems. The main purpose behind it is to predict human individual behaviors. The following points are the constructs of this module:
 - 'Outcome expectations - performance': the job-related outcomes from the systems that have direct effect on performance.
 - 'Outcome expectations - personal': the personal-related outcomes that effect the person's self-esteem and feelings of accomplishments.
 - 'Self-efficacy': the person's judgment of his ability to perform certain task on the computer or using the technology.
 - 'Affect': the user's personal preferences, such as his preference to use computers.
 - 'Anxiety': the emotional reaction that accompanies certain behavior like the reaction to using computers that can be nervousness or discomfort. [33]

All the above mentioned theories were combined together in one theory that has the most effective factors from the theories mentioned above, which is the 'Unified Theory of Acceptance and Use of Technology (UTAUT)'. In this theory, there are key moderators that affect the factors of technology acceptance which are 'gender, age, voluntariness, and experience'. Below are the main factors of UTAUT:

- 'Performance expectancy': which is how much users believes that the system will help them advance in their jobs, and perform better. This factor gets affected by gender and age.
- 'Effort Expectancy': which can be defines as the expected level of ease of use in the system. This factor gets affected by gender, age and experience. Their effect is only visible in the early stages of the system use.

- 'Social influence': can be defined as the perception of important people around the user, whether he or she should use the system or not. This factor is affected by age, gender, experience, and voluntariness.
- 'Facilitating conditions': the users' belief that there is a technical infrastructure to support the system in the organization. This factor is only affected by age and experience. [33]

The 'Effort expectancy' and 'performance expectancy', in addition to the 'social influence' have a direct impact on the 'behavioral intention', which have a direct impact along with the 'facilitating conditions' on the 'use behavior'. [33]

Another model that is used for technology acceptance is the 'Task-Technology fit (TTF)' model. This model is an extension of TAM that concentrates on the certain task accomplishment through the new system. A Task is defined as a form of action that transforms an input into an output. This model proposes that users' adoption is dependent partially on the way the new system is fitting the requirements of performing a certain task. Combining this model with TAM will be a good way to measure how tasks and technology fit. According to this combination, the measures taken into consideration would be 'precursor of use', and 'actual use'. Precursor of use is mainly covering TAM's factors (Perceived ease of use, perceived usefulness, and intention of use), and on the other hand, TTF is mainly covering the actual use of the system. TTF also measures 'Compatibility'. Compatibility is not only concerned with the fit of task requirements, but also with the fit of users' values, ideas, and beliefs. Task accomplishment in the system is mainly controlled by the 'non-routineness' of the task (how often this task is performed), and the 'interdependence' of the task (how many functions are involved in the task accomplishment). The more complicated the task is, the less the chances of technology to fit it. [17]

One of the models used to measure users' acceptance to information systems is the flow. Flow is defined as the overall impression users get about their experience that they had with a total involvement. Flow suggests that it is mostly enjoyable to use a system when the skills needed to use it are not too low or too high. If the system is too easy users will feel bored, and if it is too hard, they will feel nerves. This model is

interested in measuring the amount of enjoyment users have received from using the system, which eventually will affect their acceptance and usability. [25]

Marketing strategies can be best fit for marketing ERP solutions to users. Using these strategies can reduce users' resistance and control their attitude. In the marketing field, marketers try to convince a certain user to use a certain product. Aladwani (2001) in his article suggests that the same strategies used for marketing can apply to market ERP systems to users. There are number of similarities between the two situations. First, both are transactions that have two parties. Second, both contain the same elements; seller, buyer, and product in marketing, and implementer, user, and system in ERP implementation. Third, both situations have a problem of change resistance. On the other hand, there are some differences as well, such as considering the ERP system as a negative output if employees felt that it threatens their jobs, unlike buying a new product that is perceived as a positive change. However, the similarities are more valuable, and that is why marketing theories can still be used in the ERP adoption field. [1]

Aladwani (2001) discussed two main marketing models that can be implemented in the ERP field. The first is 'Strategic marketing', and the second is 'Consumer behavior'. 'Strategic marketing' discusses certain steps to form a marketing strategy that would have a big benefit on the long term survival of the product. The steps are explained below:

- Identifying the objectives and developing a strategy: the purpose of this step is to gather information about the customer and market, and define the strategy that will be used to attract the customer. This can happen either through 'differentiation', 'cost leadership', or 'Focus'. And 'Focus' can happen through 'Differentiation Focus' or 'Cost Focus'.
- Implementing the defined strategy: and this step needs well developed procedures and policies, in addition to top management support.
- Evaluating the achievements: this step needs an accurate feedback so that a proper analysis can be performed, and change in the strategy can be implemented if needed. [1]

The second marketing model that is discussed is called 'consumer behavior'. The aim of this model is to try to understand the factors that affect the consumers' decision. This model suggests three stages to do so; these three stages should be taken into consideration in order to achieve a final goal of convincing the customer of a certain product:

- 'Cognitive component', which deals with the 'ideas' users have about a certain object.
- 'Affective components', which deals with the 'feelings' users have about a certain object.
- 'Conative components', which deals with the 'behavioral intentions' users have about a certain object. [1]

Models of Expectations

The above mentioned models are mainly used to measure the acceptance of information systems. However, they have limitations in predictions and in offering practical implementations. That is why many studies have combined TAM with 'Expectation Confirmation Theory (ECT)'. This theory implies that the users' behavior of accepting a system depends on his or her previous experiences and satisfaction from previously used systems. In addition, the theory also relates users' satisfaction to users' expectations. The ECT can be either used on its own or combined to TAM for more accurate results. [10]

One of the most important factors that affect users' behavior towards certain system is to manage their expectations versus the outcomes of the system, and their experience. There are many theories in place that discuss the ultimate ways of managing users' expectations. The following list shows the most important theories that discuss the same:

- 'Cognitive dissonance': this theory argues that the higher the expectations, the better the evaluation of the outcome. People tend to give biased evaluation

towards their expectations. This is why the theory recommends setting the expectations as high as possible, which will lead the individuals to adjust their perceptions accordingly.

- 'Disconfirmation of expectation': this theory focuses on the distance between expectations of users and their experience using the system. This distance is called 'disconfirmation'. In the case where experience exceeds expectations, this is called 'positive disconfirmation'. And in the opposite case it called 'Negative disconfirmation'. According to the theory, the high positive disconfirmation leads to high satisfaction, where the high negative disconfirmation leads to lower satisfaction. This means that the lower the expectations compared to experience, the better evaluation received for outcomes.
- 'Met expectations': this theory suggests that any deviation between expectations and experience will result in disappointment and dissatisfaction, regardless if that deviation was in the favor of expectations or in the favor of experience. The theory emphasizes that there is an ideal point where expectations and experience balance out in order to reach to the ultimate user satisfaction. The theory is also supported by the 'equity theory' which states that positive experience will be as bad as negative one since users will feel ashamed or guilty about their expectations, and will lead to their discomfort.
- 'assimilation-contrast model': this model actually combines both contradicting theories; 'cognitive dissonance' and 'expectation disconfirmation'. The model claims that there is a tolerance range where experience variation from expectations is acceptable by users. The theory also concludes that small differences are treated by users differently than big differences. Big differences will be disappointing if they were to the favor of expectations, however they will be surprising if they were to the favor of experience. Therefore, this theory recommends setting expectations slightly higher, accurately, or extremely lower than experience in order to reach the best satisfaction results.
- 'Expectation only model': this model supports the idea that users' satisfaction is preset and depends totally on the expectations, regardless of the experience factor.

- 'Experience only model': this model supports the idea that users' satisfaction is judged only by experience and expectations have no effect on it. [2]

Dubai Holding Oracle ERP Implementation

This paper will be focusing on a recent implementation of Oracle R12 ERP system done in Dubai holding company. The project was targeting the upgrade of the system from Oracle 11i to Oracle R12. The main goal of this change is to replace outdated processes that were implemented on an out-of-support system, and implement a new technology with up-to-date business processes. This implementation covered Dubai Holding (DH) and three of its entities; Tecom Investments, Dubai Properties Group (DPG), and Emirates International Telecommunication (EIT).

About Dubai Holding

Dubai Holding

Dubai holding is a global investment company that was established in 2004. Its investments are distributed over 24 different countries. It runs its business through two main groups; 'Dubai Holding Commercial Operations Group' (DHCOG), and 'Dubai Holding Investment Group' (DHIG). [7]

DHCOG manages investments that are related to real state, business parks, telecommunication, and hospitality. It consists of four main units; 'Jumairah Group', 'Tecom Investments', 'Dubai Properties Group', and 'Emirates International Telecommunication'. [7]

DHIG is responsible of controlling and overseeing Dubai Holding Investments, financial assets, and financial services. It consists of two main units; 'Dubai Group' and 'Dubai International Capital'. [7]

Jumaira Group from DHCOG and DHIG were out of the scope of this project.

Tecom Investments

Tecom investments is a real estate developer that develops and operates Dubai's primary business parks. Its investments contain business parks operation, property development, and subsidiary management. It consists of the following:

- Free Zone Business Parks: includes 10 'tax-free' free zones that offer substantial opportunities for business growth and competitive advantages. The free zones that operate within Tecom are: Dubai Internet City, Dubai Media City, Dubai Knowledge Village, Dubai Outsource Zone, International Media Production Zone, Dubai Studio City, Dubai International Academic City, Dubai Biotechnology and Research Park, Energy and Environment Park, and Dubai Health Care City.
- Dubai Industrial City: is the second largest non-real estate project in Dubai and it provides a great opportunity for diversifying and expanding industrial businesses. It offers a competitive manufacturing infrastructure along with economical services.
- Dubai Design District (D3): is a community that targets encouraging local talents, in addition to providing a competitive place to locate fashion, design, and luxury international brands. D3 is still under construction and will be launched in 2015.
- Development and planning: this sector manages the construction and development of the free zones that belong to Tecom Investments. It is involved in the infrastructure, design and implementation of all real estate properties that are used for Tecom's parks.
- Subsidiaries: it contains two units. The first is Arab Media Group, which contains leading entertainment Organizations such as; Global Village, Done Events, and Arabian Radio Network. The second is SmartCity, which is responsible of creating knowledge-based business clusters. It has two big projects, SmartCity in Malta, and SmartCity in Kochi. [29]

Dubai Properties Group

DPG is a master developer that has built many projects in Dubai. The main business of DPG revolves around developing and managing properties, destinations, and communities. The projects that DPG has built include The Walk at JBR, Business Bay, Culture Village, and DubaiLand. [8]

DPG has three operating units:

- Dubai Properties (DP): this unit is responsible of building and serving the properties that are built for selling. This includes customer service, sales and development.
- Masat: this unit is responsible of the developing of the leasing units, and this includes mall management and land.
- Ejadah: this unit is responsible of the property management, facility management, and security solutions for DPG and non-DPG properties. [8]

Emirates International Telecommunications

This subsidiary handles communication investments in the Middles East, Europe, and North Africa. EIT handles the portfolio of communication investments through managing the deal sourcing and business development of different investors. Its investment profiles are mainly in internet service providers, telecom operators, and media and backbone companies. [9]

About Oracle R12

Oracle has launched its first financial software in the late 1980s. This software has evolved by 2009 to contain more applications such as human resource management, supply chain management, customer relationship management, and many more applications that were all bundled in one application called 'Oracle Business Suite (EBS)'. The latest release of EBS is release 12 (R12) which was released in February 2007. [12]

Oracle EBS contains many applications that were combined together. All these applications are built on top of Oracle's 'relational database management system' technology. The following are the applications within the EBS:

- Asset Lifecycle Management
- Customer Relationship Management
- Enterprise Resource Planning
 - o Financial Management
 - o Human Capital Management
 - o Project Portfolio Management
- Advanced Procurement
- Product Lifecycle Management
- Supply Chain Management
- Manufacturing [12]

Oracle EBS helps in increasing the flexibility of the organization whether it is small, medium, or big in size. It is built based on global standards and it helps the business improve by enhancing its decision making process, reducing its costs, and increasing its performance. [21]

In the project of Dubai Holding ERP, the applications that were included in the implementation are the Financial Management, Human Capital Management, Project Portfolio Management, and Advanced Procurement.

About the project

An interview was done with the project manager who was responsible of the Oracle R12 ERP implementation, and with the ERP Application Manager. Both work in Group IT which is a centralized IT department that supports all entities in Dubai Holding, and both were responsible of the delivery of this project.

As they have explained, the main drivers of the change were:

- The old ERP system (Oracle 11i) was out of support from Oracle.
- There was a need for a unified and comprehensive financial documents and charter of accounts, which was not possible to implement on the old system.
- The old system was not flexible enough to accommodate the changes that happened across DH for the past 10 years. The organizational structure and setup are irreversible, especially that when the old system was built, there was no vision of the expansion of DH business in the way it is today.
- Limitations in adding new modules and functionalities because of the lack of support from Oracle, and due to the outdated organization structure in the current system.

The project started in April, 2012. The project covered 4 main verticals; Human Capital, Finance, Procurement, and Projects (construction projects accounting). The number of key-users involved in the project was 111 users. The total number of modules implemented in the project was 30 modules. 7 modules were implemented for Human Capital; 8 modules for finance; 6 modules for procurement; 2 modules for projects; 4 modules for reporting and business intelligence; and 3 modules for governance and compliance. The total number of end-users that use the system is 5292 users.

The main objectives of the project, as per the project charter, were the following:

- Improve cash flow.
- Strengthen decision making capabilities.
- Increase organization's flexibility.
- Improve employees' utilization.

- Reduce the time needed for the finance and procurement cycles.
- Increase asset control.
- Improve reporting capabilities in generating up-to-date reports.

The life-cycle of the project was described in details by the project manager. The project started with giving orientation sessions on the new system to the management, with describing all the new technical and non-technical features available. After the upgrade was approved, the second step was to get the internal IT staff trained on the product in order to be able to participate in a more effective way in the vendor selection, project implementation, and user support.

Afterwards, the vendor selection and awarding process took place. The process started with scoping activities that included internal business management, along with IT technical management. The agreed scope was written in an RFP and was sent out for tendering. After the vendor was awarded, a methodology designed by Oracle was followed, which is called 'the application implementation methodology', which contains detailed step-by-step implementation methodology of the ERP systems. As the methodology implies, and after the project was kicked-off, the first activity done by the techno-functional team was to meet with every business department and take their input on the current work processes and write the 'as is scenarios', which has the business baseline. Afterwards, another set of meetings with the departments were held in order to consult them through the identification of future business processes in order to write the 'to be scenarios'. Within these two sets of meetings, the discussions were totally focusing on business processes with minimal involvement of technology.

Using the 'to be scenarios', the team started the process mapping phase. This stage was mainly concerned in mapping the desired business processes with the system built-in processes. After the mapping took place, the list of gaps between processes and system functions was analyzed and addressed by gap analysis exercise, which suggested the necessary customizations to overcome these gaps.

Based on the mapping, the team started what is called a 'conference room pilot test (CRP)'. This test allowed the users to see the out-of-the-box functionalities of a system

in action for the first time. The CRP went successful as per users' feedback communicated to the project manager and their sign-offs on necessary documents. The outputs of the first CRP made the team implement the second CRP, which had a sample of mapped 'to-be' processes, along with part of DH organizational chart.

The next milestone that involved users was the 'User Acceptance Test (UAT)', which had three major challenges. The first challenge was business related and it was due to a major restructure that happened on DH level. This restructure had big impact on the organizational chart implemented in the system. The second and third challenges are purely technical and they are related to data migration from the old system to the new one, and the integration with other systems in-place. However, users were relatively satisfied with the system. Their satisfaction level can be rated as 7 out of 10 as per the ERP application manager.

Training process started right after the UAT. There was a kit produced by Oracle as an interactive training session that allows users to record their actions on the system and assists them in training themselves. This kit is called 'User Productive Kit (UPK)', and it was presented in training sessions for key-users, and it was also distributed to end users. There were also training sessions with different timings on the system for users to attend at their convenience. The number of users that got the training was 43 key-users.

The biggest challenge that this project had was to align users in the same track when it comes to decisions related to the system. The project was covering many entities, and each entity has its own chiefs with their own schools and mindsets, however they all report to the same organization. It was very hard to make them agree on a single decision when it is related to different designs and different processes, especially that all entities had to follow DH standards and guidelines.

Many difficulties were faces after the system went live, which took place in July 2014. The most important one was user acceptance. The main acceptance challenge was related to process changes in the new system. Although the way the changes were

implemented was to tweak the system as per the process and not tweak the process as per the system, resistance to change was dominating over end-users.

All through its life cycle, the project was controlled by a steering committee that contained Chiefs from all business sectors involved. This steering committee had a big impact in getting business key-users' commitment in the project, in addition to their positive contribution at all stages.

Users' usability rates are very high, and it is over 80% as per the ERP manager. Their satisfaction on the system is not more than 7 and not less than 6 out of 10 as per the ERP manager. Some users that were using the old ERP system did not see a value behind the change since most of the improvements were in the back-office functionalities (such as SLA calculations and out-of-the-box report generation). Other users who had automations on the new system which were not implemented on the old system benefited more and had higher satisfaction rates.

The future plans for the system is to upgrade to the next version of Oracle R12. This will improve some aspects of the system such as performance and backend processes. There will be minimal involvement of end users in this upgrade since it is purely technical and will not change business processes.

As per the ERP Application Manager, the two main things that would have increased user satisfaction in the project implementation are; awarding another vendor with better business communication skills and better consultation experience, and customizing the user interface and giving it higher value and focus. Customizing the look and feel would have made a huge effect on users' acceptance, especially on those who usually access the system to approve only and not to perform hard-core functionality.

Methodology

This research is focusing on studying the factors that impact the satisfaction of application users in Dubai. In order to do so, the paper is using the case study of implementing the ERP system 'Oracle R12' in Dubai Holding. A survey was distributed on a random sample of 45 ERP users to serve the purpose of this study. The users belong to different age groups, different experience levels, and different work positions.

The research model under study is the TAM model that focuses on perceived usefulness and perceived ease of use. In the research, the factors of TAM were also extended to include other factors that are considered to be important for users' satisfaction and acceptance. The following are all the factors included in this study:

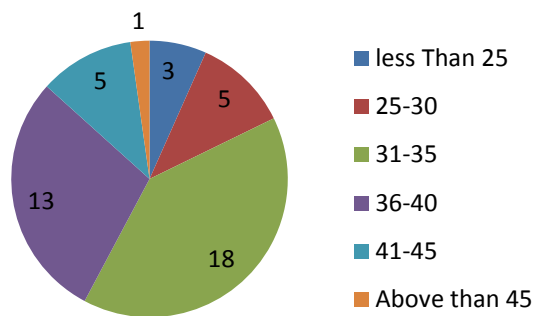
1. User's age
2. User's gender
3. User's years of experience
4. User's years of experience with Oracle ERP systems
5. User's education level
6. User's department
7. User's current employment position
8. User's level of technology knowledge
9. User's usage Frequency on the application
10. User's perception on application's performance Impact
11. User's perception on application's productivity Impact
12. User's perception on application's impact in accomplishing work faster
13. User's perception on application's Easy To Use
14. User's perception about Other ERP Systems
15. User's perception on application's ability to perform more useful features
16. User's perception about Forcing the use of application by management
17. User's perception about Using the application voluntarily
18. User's perception about how fast the system is
19. User's perception about how reliable the system is

- 20. User's perception on Reports generated by the system in terms of accuracy and reliability.
- 21. User's perception on Reports generated by the system in terms of usefulness and Sufficiency
- 22. User's perception on training sufficiency
- 23. User's perception about their involvement in sharing their work processes
- 24. User's perception about how the application's processes match their work needs
- 25. User's perception about user interface friendliness
- 26. User's perception about the time spent on the implementation
- 27. User's perception about their colleagues feedback
- 28. User's favorability of the old system

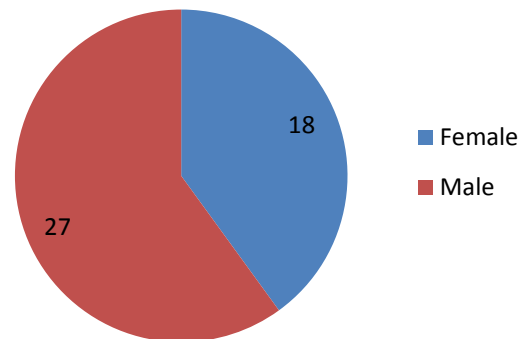
Results Analysis

The survey was distributed to users from different age groups, genders, experiences, departments, education levels, and positions. The following graphs show the distribution of users that participated in the survey among these groups.

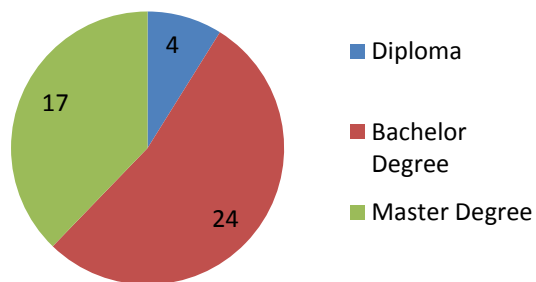
Picture 1: Age Groups



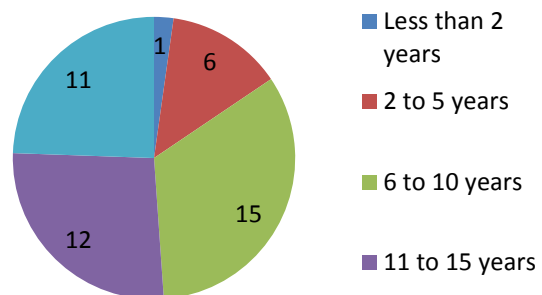
Picture 2: Gender



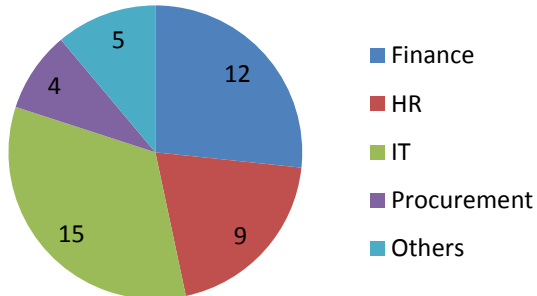
Picture 3: Education Level



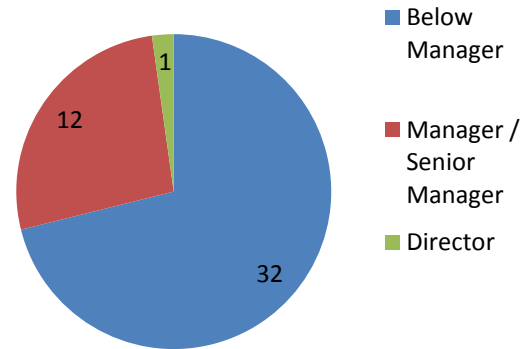
Picture 4: Years of Experience



Picture 5: Department

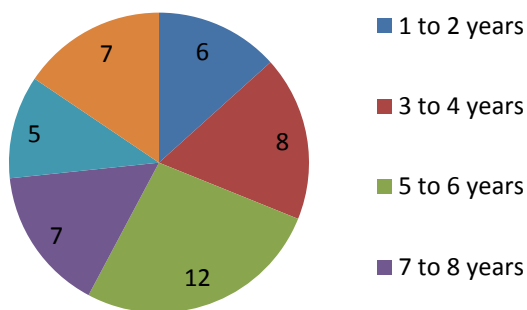


Picture 6: Employment Position

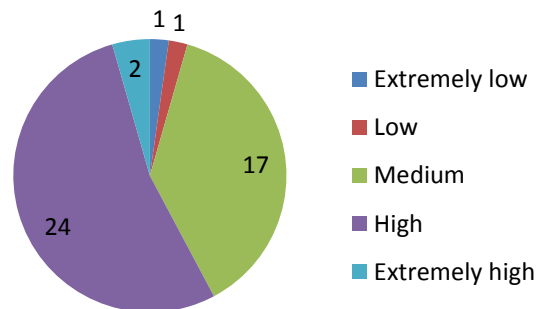


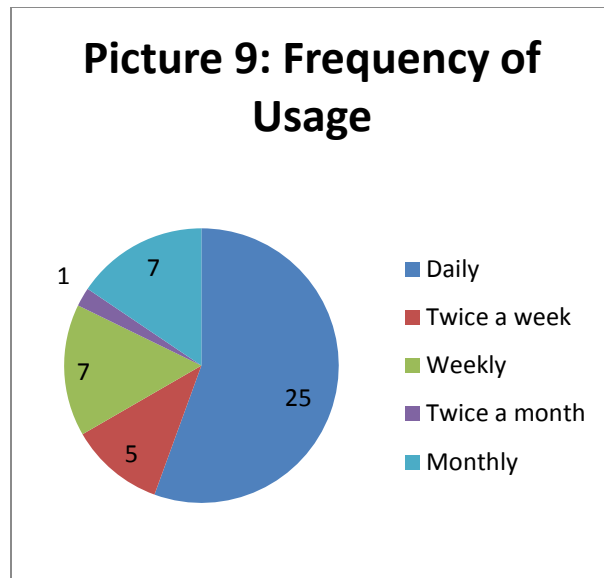
The users were also asked to specify the years of experience they have with Oracle Applications, the level of technology knowledge, and the usability frequency of the application under study. The following shows their distribution.

Picture 7: Experience with ERP Applications



Picture 8: Level Of Technology Knowledge





Since users in the sample have high diversity in all above mentioned aspects, this shows that the sample represented all groups in the corporation, which impacted the results in the same way. The sample simulates the organizations' groups in their different levels, which will give a better insight about their satisfaction and the factors that affect it.

After asking users about their overall satisfaction with the system, the rate of satisfaction was 73.3% on average. This percentage is considered high and shows that users' acceptability is in a good position. The comments that users had in the open text fields were generally positive, however the following areas had negative feedback:

- Reports: The reports are not customized according to their needs. Only out-of-the-box reports were provided.
- Look and feel: users think that look and feel is old, rigid, and not user friendly.
- Training and user manuals: the training and help materials are not enough for users. In addition, there were no help or FAQ pages in the system.

In the coming section we are trying to identify the main reasons that participated in increasing the satisfaction rates. In order to do so, the results were analyzed using one-way ANOVA research method in order to know what factors have impact on the

satisfaction. This research method was found the most suitable for this analysis since the data has more than two groups for each of the factors. In order to analyze the data, the statistical tool 'IBM SPSS statistics' was used. [18]

In the analysis, the satisfaction rate was considered the dependent variable, which is the factor that is dependent on other factors included in the study. This variable showed 95% confidence interval for Mean, which indicates the possibility of having the mean within the population. The significance level of each of the independent variables was calculated in order to show which of these factors have impact on the dependent variable 'user satisfaction'. The following table shows the independent factors along with their significance level:

Table 1

Independent Factor	Significance Level
User's age	0.34
User's gender	0.25
User's years of experience	0.37
User's years of experience with Oracle ERP systems	0.54
User's education level	0.14
User's department	0.69
User's current employment position	0.69
User's level of technology knowledge	0.22
User's usage Frequency on the application	0.42
User's perception on application's performance Impact	0
User's perception on application's productivity Impact	0
User's perception on application's impact in accomplishing work faster	0.002
User's perception on application's Easy To Use	0.028

User's perception about Other ERP Systems	0.16
User's perception on application's ability to perform more useful features	0.23
User's perception about Forcing the use of application by management	0.05
User's perception about Using the application voluntarily	0.008
User's perception about how fast is the system	0.069
User's perception about how reliable the system is	0.03
User's perception on Reports generated by the system in terms of accuracy and reliability	0.42
User's perception on Reports generated by the system in terms of usefulness and Sufficiency	0.85
User's perception on training sufficiency	0.005
User's perception about their involvement in sharing their work processes	0.014
User's perception about how the application's processes match their work needs	0
User's perception about user interface friendliness	0
User's perception about the time spent on the implementation	0.007
User's perception about their colleagues feedback	0
User's favorability of the old system	0.02

Discussion

The ANOVA method depends on comparing the means and variance within separate groups in a sample, in order to determine if a certain independent variable can be effective in predicting the dependent variable. The less the distribution of data in a given group, the more effective this group will be in predicting the dependent variable. Thus,

the less the significance level the more influential that variable will be in the prediction. The acceptable threshold for the significance level should be less than 0.05 in order to consider it statistically important to predicting the dependent variable. [13]

From table 1, the following can be considered statistical observations:

- Personal factors that contain age, gender, years of experience, education level, department, and employment position show that they are not relevant to user satisfaction. Knowing these factors has no impact in predicting users' acceptability.
- Technical information about level of technical knowledge, experience with Oracle, and usage rates are also variables that do not impact users' satisfaction.
- Variables that are related to the usefulness of the applications such as its impact on performance, its impact on productivity, and its ability to help in accomplishing work faster show that they have big impact on users' satisfaction and can help in predicting the acceptance level.
- Ease of use variable also has big influence on users' satisfaction.
- Other systems usefulness and other features available in the new system are not considered to have an impact on users' acceptability.
- Having a fast system is not directly relevant to users' satisfaction.
- System reliability shows to be relevant to users' satisfaction.
- Systems' reports do not show to have relevance to users' satisfaction.
- Training sufficiency has big impact on the acceptability.
- Users involvement in terms of asking them about their work processes and in terms of building a system that matches their work processes have also big impact on users' satisfaction.
- User interface show to have a big impact on the acceptability rate.
- Users perception of the time spent on the system also show to have impact on users' acceptability.
- Environmental factors such as having the system forced by management, or using the system voluntarily, in addition to the influence of other colleagues show big impact on the satisfaction.

- Users' preference to old system has big impact on satisfaction as well.

From the above observations, statistics show that TAM model that focuses on perceived usefulness and perceived ease of use is valid for Dubai application users. Results show that the system is evaluated based on work related factors and not biased toward personal factors, or towards other systems' experiences. The model that can be formed for users' acceptance in Dubai is another extension of TAM model that includes the following factors:

- System usefulness
- Ease of use
- System reliability
- Environmental factors
- Users' involvement
- Training
- User interface
- Perception of effort spent on the build of the system
- Old system preference

The purpose of this analysis is to come up with a model that measures the satisfaction of users in this region. By knowing the importance of users' adoption to new systems, information technology departments, project managers, along with marketing parties in the companies should build their applications and project management processes in a way that sets users acceptability as a main target. Knowing the factors that affect and influence users' perception of applications should assist these parties in identifying the main points that they should focus on in order to achieve this target successfully. By achieving this target, companies' investments in new applications will have the desired return. Failing to achieve this target will result in losing the cost of the investment; in addition to losing all the benefits that this system could have brought to companies' performance and efficiency.

Limitations

The main limitation in this study is using a system that was not optional to be used. The system usage was forced on employees by their management. The usage rates were not giving any real indicator since the system was the only way the employees could accomplish their daily tasks. Nevertheless, employees did not have the option to replace the system or perform work manually. A system that is used voluntarily, such as an internal communication portal, could have given better measures of adaptation by considering the usage rates and how often the system is visited. This important measure was missed in this study.

Another limitation of the study is not including a specific survey for measuring the expectations of users before implementing the system, and comparing the results to their feedback on the system after it was launched and after they have actually used it. This comparison would have been beneficial in forming a new model for managing users' expectations from the initial stages of the project, up till the end of the project implementation.

Conclusion

In order for a new system to get accepted by users in Dubai, the new extension of TAM model should be used by companies' decision makers. The survey used in this study was conducted by 45 Oracle R12 system users that work in Dubai Holding. An extension of TAM model was the main output of the analysis. That model covers the main constructs which help in increasing user satisfaction in ERP projects implemented in Dubai. These factors are related to users' perception about system's usefulness, ease of use, reliability, user interface and trainings. In addition to other factors related to users' involvement in the project life-cycle, organization's environmental factors, perception of effort spent on the project, and old system preference. These factors will impact the usability of the system, and the performance of the employees on the system. These factors tackle the system implementation process in all the stages of the software lifecycle. Therefore special attention should be given to this area by project managers and technical team. Other factors in the study showed no relation with users satisfaction, such as reports generated from the system, personal factors (such as age and gender), and users' technical background.

IT implementations should not be considered as engineering projects, big part of IT projects should be directly related to organizational behavior and social science. New systems are mainly used by non-technical business users. These systems interfere with their daily work activities and with the way they perform their jobs. In order to get the promised return on investment in implementing any new system, it is not enough to build a robust system that performs great functionalities. Users should feel comfortable and happy about using the system in order for it to improve productivity and increase revenue.

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Appendix 1: Survey Questions

This survey is to measure your satisfaction level of Oracle R12 system. Please keep in mind that this survey will be totally anonymous and will only be used for educational purposes.

1. Age range

- below 25
- 25-30
- 31-35
- 36-40
- 41-45
- above 45

2. Gender

- Female
- Male

3. Years of experience

- Less than 2 years
- 2 to 5 years
- 6 to 10 years
- 11 to 15 years
- More than 15 years

4. Years of experience with Oracle ERP systems

- Less than 1 year
- 1 to 2 years
- 3 to 4 years
- 5 to 6 years

- 7 to 8 years
- More than 8 years

5. Education level

- High School
- Diploma
- Bachelor Degree
- Master Degree
- Doctorate Degree

6. Department

- Procurement
- Finance
- HR
- IT
- Others

7. Employee Position

- Below Manager
- Manager / Senior Manager
- Director
- Above Director

8. Technology knowledge level

- Extremely high
- High
- Medium
- Low
- Extremely low

9. I use Oracle R12

- Daily
- Twice a week
- Weekly
- Twice a month
- Monthly
- Every 3 Months
- Every 6 Months
- Yearly

10. Oracle R12 system helped improve my performance (KPIs)

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

11. Oracle R12 system helped improve my productivity

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

12. Oracle R12 system made me Accomplish my work faster

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

13. Oracle R12 System is easy to use

- Strongly agree

- Agree
- Neutral
- Disagree
- Strongly disagree

14. I think other ERP systems can help more than Oracle R12

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

15. I think Oracle R12 System can have more useful features

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

16. I only use Oracle R12 system because it was forced by the management

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

17. I would voluntarily use Oracle R12 System

- Strongly agree
- Agree

- Neutral
- Disagree
- Strongly disagree

18. Oracle R12 system is fast

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

19. Oracle R12 system is reliable

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

20. Reports generated from the Oracle R12 system are accurate and reliable

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

21. Reports generated from the Oracle R12 system are useful and sufficient

- Strongly agree
- Agree
- Neutral

- Disagree
- Strongly disagree

22. Sufficient trainings on Oracle R12 System were provided

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

23. I was asked about my work process during the implementation of Oracle R12 system

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

24. The process implemented in Oracle R12 System matches my work needs

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

25. Oracle R12 System interface looks nice and user friendly

- Strongly agree
- Agree
- Neutral

- Disagree
- Strongly disagree

26. Time spent on Oracle R12 System implementation was fairly reasonable

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

27. My Colleagues have positive feedback about Oracle R12 system

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

28. I like using the old ERP system more

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

29. I am overall satisfied with Oracle R12 system

- Strongly agree
- Agree
- Neutral
- Disagree

- Strongly disagree

30. Please write suggestions of how Oracle R12 system would have been more satisfactory

31. Please provide general comments about Oracle R12 system