

Effective technology  
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## Effective Technology Acceptance in ERP Implementation Projects through

**Training & Education Abstract:** Many firms are implementing enterprise resource planning (ERP) systems. The expensive nature of these systems requires that effective usage of these systems be attained in order for an organization to derive the expected benefits from the technology.

Nearly all ERP implementation projects requires a well established Project Management (PM). We made a survey about SAP enterprise resource planning implementations at a division of a major pharmaceutical manufacturing company in order to determine adequate training& education methods for effective and efficient ERP implementation. In this research our focus is training and education phase of ERP implementation project. In order to analyze the effects of training and methods for adequate training for effective ERP implementation projects; we conducted interviews with the employees after their ERP training process and representatives of global training companies. Keywords: Education & Training, Technology Acceptance Model, ERP Implementation, Project Management, Critical Success Factors I.

**INTRODUCTION** Today no one would dispute that information technology (IT) has become the most important cornerstone of an enterprise's ability to successfully compete in the global marketplace. As IT power and presence have expanded, companies have started viewing it as a competitive advantage rather than costs, even more critical to their success. ERP software package, as one of the most important IT systems is now gaining the universal attention from most enterprise worldwide. Market researcher International Data Corp (IDC) predicted a compound annual growth of 11%

for the worldwide ERP market from 2001 to 2006, reaching US\$39. 6 billion at the end of the forecast period.

Bingi et al. (1999) suggest that implementing an ERP system is a careful exercise in strategic thinking, precision planning, and negotiations with departments and divisions. It is important for companies to be aware of certain critical issues before implementing any ERP package. Careful consideration of these critical success factors (CSFs) will ensure a smooth rollout and realization of full benefits of the ERP solution. Education/training is probably the most widely recognized critical success factor, because user understanding and buy-in is essential.

ERP implementation requires a critical mass of knowledge to enable people to solve problems within the framework of the system. I. 1. Definition and Significance Of The Problem For many firms, a significant part of the enterprise resources planning (ERP) implementation problem lies in the area of project management (PM).

PM for ERP application packages has four distinct stages as Concept/initiation, Development, Implementation and Closeout/operation maintenance. PM implementation stage starts with training. Training is an important driver of ERP implementation success (Russo et al. , 1999; Stratman and Roth, 1999). Training offers a good opportunity to help users adjust to the change that has been introduced by the ERP system, and helps build positive attitudes toward the system. Teaching each of the various user groups how the ERP system works is important in creating awareness (Stratman and Roth, 1999).

Further, training provides hands-on experience for the users: they appreciate the quality attributes of the system and its potential benefits. Inadequate training has been one of the significant reasons of many ERP systems failure (Gupta, 2000). In ERP implementation projects, despite millions of dollars and hundreds of deployment hours, many projects fail because of the lack of adequate training (Kelley et al. , 1999). A particular challenge in ERP implementation is to select an appropriate plan for end-user training and education. ERP training should address all aspects of the system, be continuous and based on knowledge transfer principles wherever consultants are involved (Davenport, 1998 a, b).

The success of the ERP implementation is directly influenced by this training step dilemma. If employees don't accept this technology, they don't want to use it. It affects their attitude towards the system, so that the general performance would be decreased. I.

2. Goal Of The Study HR departments are responsible to store personnel information such as education, salary etc. about their employees. This large amount of data is not easy to hide, use or retrieve. So that they need an Information System (IS) to properly manage them.

An appropriate ERP-HR module helps to accomplish these functionalities of HR successfully. ERP-HR implementation process should be well managed and that is why we need project management in order to implement the system and make the success of the new system sustainable. Since the implementation of ERP is complex, covering as it does a combination of hardware, software, and organizational issues, effective project management

allows companies to plan, coordinate, and monitor various activities in different stages of implementation (Ngai, et al, 2007). Our main purpose of this research is to measure whether the training is a useful step for HR employees according to the technology acceptance model or not and to define appropriate training methods in order to imply an efficient and effective ERP implementation project.

Based on the below examination of literature, we propose a framework based on an extension of the technology acceptance model for ERP projects incorporating satisfaction with training as a factor in perceived usefulness of ERP systems and perceived ease of use of ERP system, personal and job characteristics and environmental factors. II. LITERATURE SURVEY II. 1.

Importance of PM in ERP implementation Since the implementation of ERP is complex, covering as it does a combination of hardware, software, and organizational issues, according to Ngai (2007) effective project management must be executed by the companies to plan, coordinate, and monitor various activities in different stages of ERP implementation.

Successful ERP implementation requires that the organization engage in excellent project management. This includes a clear definition of objectives, development of both a work plan and a resource plan, and careful tracking of project progress (Lauglin, 1999; Sherard, 2000). Because of this reason according to Elisabeth J. Umble, et al (2003) excellent project management is one of the critical success factors of ERP implementation projects.

II. 2. Training & Education as a CSF in ERP Implementation The “ people element” and training aspect of an ERP implementation have historically

received the least amount of attention. The paradox of this is that when this factor is ignored or downplayed, primarily because it does not have the largest quantifiable benefit, expenses are greatly increased in the long run. By treating resource training with little regard and financial support, it is not hard to realize the reality of delay, confusion and financial ruin that may result at the end of an ERP implementation project. Some companies insist on assigning a fixed cost or percentage to the training effort regardless of need or variable conditions.

(Gargeya and Brady, 2005) Inadequate training has been one of the significant reasons of many ERP systems failure (Gupta, 2000). In ERP implementation projects, despite millions of dollars and hundreds of deployment hours, many projects fail because of the lack of adequate training (Kelley et al. , 1999). Because of above stated reasons user training and education has been largely considered in many research papers as a critical success factors (CSFs) of ERP implementations projects.

The CSFs have been studied in information system implementation for a long time. Based on literature review Nah identified 11 CSFs (Nah, 2001), Somers and Nelson listed 22 CSFs. And these researches show that lack of user training and failure to completely understand how enterprise applications change business processes frequently appear to be responsible for problem ERP implementations and failures. Elisabeth J.

Umble, et al (2003) divide CSFs into 10 categories and extensive education and training is one of them. She admits that education & training is probably the most widely recognized critical success factor, because user

understanding and buy-in is essential. II. 3. Technology Acceptance Model (TAM) One of the key measures of ERP implementation success is achieving the intended level of usage of the IT.

According to Venkatesh (1999) system usage is a reflection of the acceptance of the technology by users. The Technology Acceptance Model (TAM) has served as a basis for past research in IS dealing with behavioral intentions and usage of IT. Davis (1989) developed the TAM based on the Theory of Reasoned Action. The TAM uses two variables, perceived usefulness and perceived ease of use, as determinants of use. The perceived usefulness is based on the observation that “ people tend to use or not use the application to the extent they believe it will help them perform their job better” (Davis, 1989).

Even if an application is perceived as useful, it will only be used if it is perceived as easy to use, that is, benefits of usage outweigh the effort of using the system. These two determinants result in the user's attitude toward using the software system, which in turn leads to the user's behavioral intention to use. Venkatesh and Davis (2000) were made extensions to the TAM theory though examining two belief constructs underlying TAM. A better understanding of these constructs enables designing effective organizational interventions that might lead to increased user acceptance and use of new IT system. II.

4. Factors Affecting Training & Education Training is one of the most pervasive methods for enhancing the productivity of individuals and communicating organizations to personnel (Gupta, Bostrom, 2006). Training

strategy (bu herhangi bir training strategy mi, yoksa bu adamin (olfman) mi bole bi strategysi varmis?? ) has four dimensions: Training outcome, training methods and delivery mode, users and learning content (Olfman et al, 2003). Each dimension has multiple components and mechanisms to implement them. The dimensions and their components are shown below in Table 1.

Table 1: The Dimensions Of Training Strategy And Their Components

Dimensions	Components	Example Best Practice Mechanisms
TRAINING OUTCOMES	Knowledge levels addressed	Best Practice: At least up to motivational level • Knowledge levels • Assessment and evaluation   Lower levels: Use functional area personnel as trainers   Address motivation: Use specific business process examples during training   Address business procedural: Including business process training in materials
TRAINING METHOD AND DELIVERY MODE	Who trains and how trainees receive	Training Best Practice: Mix of instructor-led and self-based multi-method delivery [mix of traditional and on-line] • Instructor led vs. self-based • Traditional vs. on-line   To decide on a whether to use instructor-led or self-based   To decide on traditional or on-line delivery mode
USERS	Classifying users and matching with training method	Best Practice: Match users to training method by job class and learning style [or free choice] • Job class • Learning style   To classify users according to job class Hold training sessions where all trainees are from the same job class. Tailor outcome level accordingly   To classify users according to learning style Tailor training content according to whether a learner is active or passive learner
LEARNING CONTENT	What is conveyed in training and in what chunk size	Best Practice: Smaller learning chunks of material or objects that can be combined • Chunk size and combinability •

Training material • Training setting | To implement appropriate chunk size  
Conduct task and process analysis to determine usable and combinable hunk size. Develop learning object module accordingly. According to Gupta and Bostrom training methods refer to the method by which participants learn.

The effectiveness of a training and education is directly influenced by the training method. Training methods are the set of materials and activities that are designed to impart the required knowledge to the trainee (Bostrom et al, nd). Training materials deal with the organization of documentation provided to the training participants, whereas, training activities focus on the procedures followed in imparting training to the participants. End user training used a combination of these two to implement various training methods (Gupta, Bostrom, 2006). The learning process of a trainee is influenced by both individual differences and support provided.

Training will not be treated as a separate event needing follow-up; learning will be continuous, workflow/job driven and available on demand (Sketch, 2003). Learning outcomes are the results of the training process (Bostrom et al, nd). Knowledge gained out of a training program represents an understanding of the principles by which a system can be applied to a business task (Heinen et al, nd). III. METHODOLOGY In order to measure the technology acceptance of users of the ERP-HR Module through trainings & education and to define an appropriate training in order to imply an efficient and effective ERP implementation project, we deployed interview techniques.

Qualitative research methods are more diverse than quantitative methods. Data will have been collected through interview and searching documents.

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The study carried out in a large global organization that is implementing an ERP system and a global ERP education company. The ERP software that has been chosen by the company is SAP.

The study of the implementation using SAP R/3 is of particular interest because it is considered the leading software. An interview is a purposeful discussion between two or more people (Kahn and Cannel, 1957 cited by Saunders, Lewis & Thornhill, 2000). The use of interviews helps to gather valid and reliable data that are relevant to research questions and objectives. Structured interviews use questionnaires based on a predetermined and standardized or identical set of questions. The interviewer read out each question and then records the response on a standardized schedule, usually with pre-coded answers (Saunders, Lewis & Thornhill, 2000).

By comparison, semi-structured interviews are non-standardized. In semi-structured interviews, the researcher will have a list of themes and questions to be covered although these may vary from interview to interview. This means that some questions will be omitted in particular interviews, given the specific organizational context which is encountered in relation to the research topic. The order of questions may also be varied depending on the flow of conversation. On the other hand, additional questions may be required to explore the research question and objectives given the nature of events within particular organization. The nature of questions and the ensuing discussion mean that data will be recorded by note taking, or perhaps by tape recording the conversation (Saunders, Lewis & Thornhill, 2000).

Unstructured interviews are informal. There is no predetermined list of questions to work through in this situation, although you need to have a clear idea about the aspects. Each type of interview has a different purpose. According to Saunders and Thornhill (2000) structured or standardized interviews can be in survey research to gather data, which will then be the subject of quantitative analysis. Semi-structured and in-dept, or non-standardized, interviews are used in qualitative research in order to conduct exploratory discussions not only to reveal and understand the “ what” and the “ how” but also to place more emphasis on exploring the “ why” (Saunders, Lewis & Thornhill, 2000). Because of nature of technology acceptance in ERP implementation projects through Training & Education is to answer “ what” and “ how” questions, semi-structured interviews are chosen.

A certain set of questions are prepared in order to obtain relevant data to research. Also this preserves the flexibility of the interview and makes room for additional information not thought of.

### III. 1. Brief Background of The Research Company

Our research company is one of the Turkey’s largest pharmaceutical manufacturers.

Also it has been a part of a large scaled global company. According to company’s global strategy, they attempted to integrate all departments and functions across a company onto a single computer system that can serve different departments’ particular needs. So that they had been implemented an ERP system and as ERP vendor SAP R/3 was chosen from the global executives. In ERP portfolio of the company, there are SAP modules for driving main production processes, finance and controlling processes and HR

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processes. An overall ERP portfolio is shown below in Figure 1: Figure 1: ERP Portfolio Of The Company The production related and financial ERP modules have been “ go-live” since 1 year. But the implementation project of the HR modules is not complete yet.

The user training & education part will be the interest of our study. We conducted interviews 1 week after the training & education phase in order to measure the technology acceptance of the HR employees and define the appropriate training method for effective and efficient ERP implementation.

III. 2.

Brief Background of The Education Company Buraya project planin da eklenmesi gerekiyor. IV. FRAMEWORK The major steps of the our research projects are literature review, data collection, the analysis of the data collected and last but not least the evaluation of the analyze results. In the literature review we made a comprehensive research on the literature about technology acceptance model in ERP implementation, training as an enabler of technology acceptance and different training strategies. Afterwards we collected data in order to analyze what employee’s behavioral intention to the new ERP system after the training step and how they would form an effective training with respects of different training characteristics. The next step was the analysis of these collected data and finally we interpreted our results.

Amoako-Gyampah and Salam (2004) studied the impact of a “ belief construct” described as “ shared beliefs in the benefits of a technology” and training and communication on perceived usefulness and perceived ease of

use during an ERP implementation in a large global organization using SAP R/3. They found that training influenced both shared beliefs and perceived ease of use demonstrating the importance of training in technology acceptance. Therefore we purpose to analyze whether training satisfaction is related to perceived ease of use and perceived usefulness or not. According Bradley and Lee (2007) the perspectives of gender and job types affect the perception of the adequacy and completeness of training. That is why we purpose to add personal and job characteristics in our research model.

What is more their analysis shows that training satisfaction is a factor leading to usefulness, which they define as employee perceptions of ease of use of the ERP system in doing their job. At the end our main purpose is to determine an appropriate training method for effective and efficient ERP implementation project. According to Olfman et al (2003) the training strategy has four dimensions: Training outcome, training methods and delivery mode, users and learning content. Additionally; with respects of these aspects we build our research model to generate some propositions for effective& efficient ERP training. Figure 2: Purposed Research Model As shown in the Figure 2, our purposed research model combines two previous studies. While conducting our research we followed up this framework.

There are three important factors that play role on successfully implementation of an ERP project. Training and Education, as the major subject of this project, has been largely considered in many research papers as a critical success factors (CSFs) of ERP implementations projects. Training and Education are though to have an important affect on both the technology acceptance of the employees and successfully implementation of

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an ERP project. Environmental characteristics like competitive pressure have a direct effect on ERP implementation success and end user satisfaction.

User also is an important factor affecting success of the ERP Implementation project. Lack of care about users of the system will lead to a disaster. Here, the term user consists of the capability of the user, the innovativeness of the user, support activities given to user and the gaps of user with organization and technology. Having capable and innovative users who are well-educated, experienced, responsible and knowledgeable will have a positive effect on the adoption of the ERP systems, as these users will not resist using the system at first sight. Obviously, having such users is not enough, because they should be provided with support like training, information sharing, and effective communication and help desk activities. Up to now, a lot of research was done to prove the importance of training on adoption (Al-Mashari et al.

, 2003; Aladwani, 2001; Bingi et al. , 1999; Calisir & Calisir, 2004; Gyampah & Salam, 2004; Somers & Nelson, 2003, 2004; Umble et al. , 2003; Wilder & Davis, 1998; Yusuf et al. , 2004). Unless training, information sharing, effective communication and help desk activities are provided, people cannot have a better understanding of how their jobs are related to other functional areas within the company and also they cannot know to operate the new system.

Consequently, they cannot feel involved in the new ERP system (Zhang et al. , 2005). V. FINDINGS As we mentioned before, our research company is one of the Turkey's largest pharmaceutical manufacturers.

Also it has been a part of a large scaled global company. We made deep interviews with 5 employees from same department but different hierarchy with different job descriptions. The interviews are conducted with two different styles. We made group interview with two of them together and individual interviews are conducted with the rest. The average duration of interviews changes between 20 minutes and 45 minutes. Two of the interviewees, whose age are between 25-35 and gender is female are working as Human Resources Specialist in Recruitment subunit.

One of the interviewees is working as HRIS Specialist in Personnel Affairs, and he is 24 years old. One of them is the project manager and working in Personnel Affairs and he is 36 years old. And the other one is working as Personnel Affairs Specialist and he is 34 years old. Three of our interviewees have past experience with an ERP system. All of them have high computer literacy and they use computers in their work environment. All of them wanted to change the old system they are ready to implementation of the new ERP system.

All of them are graduated from university and also one of them has a master degree. During the training step of ERP Implementation there were two different types of training. One of them was like a help desk activity and the trainees, who are working in Personnel Affairs subunit, thought to have knowledge regarding the program. The other training type began with an initial training which includes general concepts of SAP and continued with the demonstration of the program. Through this research, we had the chance to answer these two questions.

First relates to “ how education should be tackled”. 3 interviewees out of 5 stated that the ones who will provide education need to know the ones they will educate first, that they need to assess the level of knowledge of the subjects and they should develop a plan accordingly. Furthermore the educators need to make sure that the subjects absorb the education fully. The ones who provide education, how it is provided and foreseeing the documentations to be used comprise the most significant parts of an effective education. Moreover, preparing the subjects who will receive education psychologically is another crucial point.

Furthermore, education really matters according to TAM, because all of the 5 interviewees stated that the usage got easier after education and that they adjusted more easily. There have been 2 different educations at the company we interviewed. The first is a daily education designed for human resources specialists; it was tackled through presentations mainly. The subjects have directed their questions, if any. 2 of our interviewees deem the education sufficient as they did reporting and state that they were more comfortable with SAP usage after the education. They further add that they were able to cope with the programme relying on their prior knowledge, even if they’re not given education.

They further put that thanks to the education, the overall mentality of SAP is understood and they gained time through this education. The work is accelerated, the efficiency is improved thanks to the education, they say. In sum they think this education has been to the point. The education directed towards subjects in technical sphere differs in some respects. The education

targeted at this group is permanent but not sufficient. These people regard the consulting company insufficient.

They had problems at the beginning, because they are not mentioned about the good dimensions, about the parts those would help them of the new system. Apart from this, they find it generally okay. Interviewing with only one company at this system is our limitation. Moreover an interview comprising 5 people may not suffice. However these are the results we reached with the available sources. Lastly, our recommendations out of this research are rightly choosing the consulting company, determining the scope of the education and the educators, determining the personal features and the features regarding occupation and developing the education in accordance with these factors.

VI. CONCLUSION The “ people element” and training aspect of an ERP implementation have historically received the least amount of attention (Gargeya and Brady, 2005). Also inadequate training has been one of the significant reasons of many ERP systems failure (Gupta, 2000). Because of above stated reasons user training and education has been largely considered in many research papers. However there is a lack of empirically supported research on the training methods. This is the reason why we choose training in ERP implementation.

Main goal of this study is defining the appropriate training methods for effective and efficient ERP implementation. In analyzing the literature we found that training is important when implementing a new ERP system.

Further, training provides hands-on experience for the users: they appreciate

the quality attributes of the system and its potential benefits. According to Davenport ERP training should address all aspects of the system be continuous and based on knowledge transfer principles wherever consultants are involved. In our research opposite to the literature, in the training, directed towards subjects in technical sphere, the consultants didn't pay enough attention to the training.

The training was continuous but inadequate so the users couldn't appreciate the quality attributes of the system and its potential benefits. So they had difficulties in adoption to the new system. On the other hand the other training is a daily training designed for human resources specialists and it was sufficient and they said that they were more comfortable with SAP usage after the education. Also according to literature training strategy has four dimensions: Training outcome, training methods and delivery mode, users and learning content (Olfman et al, 2003). As a training outcome knowledge level has to be addressed.

In our research the trainers didn't give importance to the knowledge level. The interviewees say that they were able to cope with the programme relying on their prior knowledge, even if they are not given education. Our results confirm that rightly choosing the trainers and consultants is important and determining the scope of the education, the personnel features and knowledge levels is very important in order to define an appropriate training for efficient and effective ERP implementation. This investigation has limitations that should be pointed out. The generality of the findings remains to be shown by future research.

The results may not be generalized because only one organization was studied. Moreover an interview comprising 5 people may not suffice. Further research is needed to explore the right raining methods for efficient and effective ERP implementation. REFERENCES [1] Amoako-Gyampah, K. , & Salam, A. M.

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