

Readiness Assessment of Human Resources (HR) for ERP Implementation in Governmental Organization; Case Study: The Agricultural Jihad Organization of Qazvin Province

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Abstract: Enterprise resource planning (ERPs) are module-based system which help organizations to integrated flow of information throughout them. They increase synergic inter-department decision making and lead to performance enhancement via cost reduction and improvement of productivity and supply chain management. Considering high rate of ERP implementation project's fails, the most aspect of ERP implementation returns to readiness assessment. The context of governmental service organizations (GSOs) has specific characteristics in comparisons of other organizations. The joint aspect of three dimensions of such organizations -service, employee and system-is human resource (HR). Hence, organization readiness assessment should be concentrate on HRs' readiness assessment. The current research focuses on this area and tries to assess technology readiness as core of organization readiness for ERP implementation, which has been approved by many research that have positive effect on system adoption and use. In the other hand technology readiness referees to lower levels of resistance and higher levels of participation and intention to experiences new systems which in ERPs because of their role in business process reengineering (BPR) are very crucial and critical. Then the research applied to agricultural jahad organization of Qazvin province and the results have been reported.

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1.Introduction

Enterprise Resource planning (ERP) are systems that help organization to integrate their flow of information and business process. The "ERP" phrase is a General concept that refers to collection of organization Tasks that have been supported by multi- module applications for managing of their Resources (Teltumbde, 2000). There are varied definitions of this concept. Some of Authors emphasized on performance and information need as most important result of it (Elbertsen et.al, 2006) and other concentrated on managing of different resources as most important aspect of ERPs. (FinneyandCorbett, 2006). There are several reasons for using of ERPs: Financial information integrating, standardization and Accelerating to production process, inventory Reduction, and so on. Lonzinsky (1998) cited other contradictory reasons such as office growing and Respective diminishing of costs simultaneously, decentralization and strengthening of control. Clyde and mark (2005)believed on some advantages such as increasing of business flexibility, business process reengineering (BPR), supply chain optimization, supporting of globalization and validity enhancement of decision- making. Although

the varied advantaged have been cited in many of researches, there are several problems and faults which threat implementation's success of ERPs. The implementation process is highly time-consumed. Panorama consulting groups(2010) indicated at least time for ERPs implementations is equal one Year. The other problems in ERP implementation are: ERPs implementation need to high investments and any fails in implementation project led to wasting of money, time, and human resource (HR) efforts. ERPs consisted of different components Such as financial Accounting, control, Assets management, project management, flow work system, HR system, quality management, sales and order management. And so on. In last versions of ERPs which called ERP II, the customer relationship management and supply chain management added to other cited components. These components often called modules. The most important aspect of modules -in comparisons of other information system (IS), returns to synergic intra-functions of ERPs. They integrate and optimize information flow throughout organization in Real-time.

2- ERP implementation

The success of ERP implementation and attaining of pre-defined goals are subjects which have been considered by many Researchers. Some of them concentrated on the technical aspects and other on the organizational aspects. The importance of implementation success area returns to high rate of investment and time that have been need for it. Panorama consulting group (2010) reported: the time of ERP implementation project in 2010 has been increased to 61% in comparison of 35% in 2009. It indicated the cost of ERP implementation project in 2010 has violated up to 70%. The high rate of cost, time and even fails of ERP projects brought implementation success and readiness Assessment as one of most problems among ERP area. Since ERP researches have been performed in industrial context mainly and it didn't appropriate for service organization, this research have tried to cover Governmental service organizations (GSOs) by emphasizing on HR aspect of them. These organizations have some characteristics in comparison of other organizations, which have been described in below.

3- GSOs Characteristics

The current economy is based on services rather than goods; which has been called post-industrial age. The most important aspect of post-industrial age returns to service-centric organizations and their revenues. The service-oriented systems in comparison with good-oriented systems are Act-oriented and are highly Labor-intensive. Labor-intensive refers to organizations consideration to labors rather than facilities and equipment. These systems are highly customer contact and their performance attained in consumption point (Botta-Genoulaz and millet, 2006). In the other hand, customer appraisal of such systems don't attain before completing of services (Redman and mathews, 1998). Other difference of service-oriented organization in comparisons with production-oriented organization returns to planning and integrating of information systems (Botta-Genoulaz and millet, 2006). Although in production organizations, we face with material flow and then information flow; in service organizations knowledge flow is crucial role in planning process. Albrecht and zemke (1985) emphasized that service, people and system are three important elements of service organizations. Considering of cited characteristics of service organization; the HR role and position have been considered as Axis and center of any service organization. Among service organizations, the Governmental service organizations inherit HR's crucialrole beside of other characteristics. Nonetheless, There are some differences between GSOs and service organizations. They are less

flexible and more under controlled. They face with two important issues. One returns to changing demand and needs which enforce them to offer new service and existing service in new ways. The criteria of quality and proposition time are crucial in this issue. The second once, returns to contextual area including legislation, Up hand policy-making and strategic goal-settings. This issue limits Governmental service organizations and may be led to lower flexibility and social responsibility. The GSOs can be benefit from ERP implementation, although the main reasons for it among these organizations are: Real-time integrating of information which may be separated among different functional departments. According to meta research, upper than 70% of local and Federal Governmental organizations, have been implemented or were implementing for 5 next years in 2002 (Kumar er. Al, 2002). The GSOs have several issues in ERP implementation because of social and law obligations and the culture which be specified to them. Another characteristic of GSOs is uncompetitive context and environment, which led to less agile process and hence, influence the ERP implementation project. Because of uncompetitive environment for GSOs, There aren't enough pressures which force them for innovating and Risky tasks (Rosacker and olson, 2008). The GSOs have two main different in Comparisons with service organizations: first that these organizations can't propose full or mass-customization service because of legislations that influenced them and should be apple to their entire customer. The next main different is: the functional integration which researches cited it doesn't appropriated for service organizations can be the essential and persuade these organizations to ERP implementation.

4- System Adoption

Considering HR- centric characteristic of GSOs can be put HR functions as most important aspect of ERP implementation. Rosacker and olson (2008) cited this factor as most important critical success factor (CSF) among implementation life cycle; The finding which has been approved by previous Researches (Pinto and Prescott, 1988; Belout and Gauvreau, 2004). Hence attitudinal factors as source of behavior- production should be considered in ERP implementation seriously. This factor can be discussed as origin of ERP adoption and criteria for implementation success. This subject has been considered by several Researches. Abdinourhelm et. Al (2003) emphasized that the negative attitudes cause the negative behaviors and led to undesired sense after implementation of ERP. They indicated the attitudinal and behavioral factors are core of organizational readiness for ERP

implementation. Kwahk and Lee (2008) indicated the employees' perception of usefulness and ease of use of ERP, have significant effect on ERP adoptions and intention to using ERP.

5- Human resource readiness

The ERP's implementation will be face with Radical and semi-radical changes which may be led to resistance, overloading of information and other issues (Somers & Nelson, 2004). A respective critical task in this area is providing and sustaining of positive Attitude to implementation (Parrand Shanks, 2000; Ross and Vitale, 2000; Kumar et. Al, 2002). Some researches indicated the HR readiness

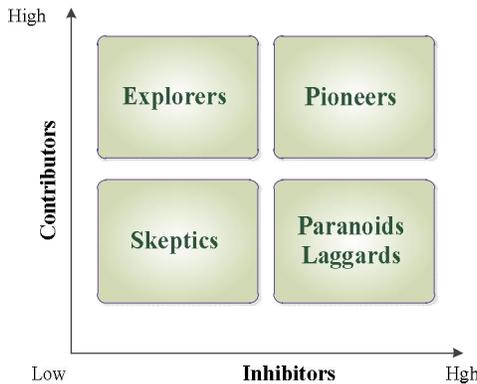


Fig 1. TRI's Clusters

to change led to positive Attitudes and intention to system use (Walczuchet. Al, 2007; Kwahk and Lee, 2008). There are few models for sssessment of human resources readiness. The most important models of them are Technology acceptance model (TAM) and Technology readiness index (TRI). TAM emphasize on perception of employee on system adoption. Itconcentrates on perception of usefulness and ease of use (Davis, 1989). TRI emphasizes on optimism and innovativeness as positive factors and discomfort and insecurity as negative factors (Parasurman, 2000).Optimism

dimension refers to a positive view of technology and a belief that it offers people increased control, flexibility and efficiency in their lives. Innovativeness dimension Assesses tendency to be a technology pioneer and thought Leader. Discomfort is a perceived lack of control over technology and a feeling of being overwhelmed by it. Insecurity is Distrust of technology and skepticism about its ability to work properly. Since TAM is based on experience of system and its use; it isn't suitable for HR's readiness assessment in pre-implementation phase. In the other hand, TRI is based on employees perception and attitudes on Technology which be influenced by previous information system implementation; it is more suitable for HR's readiness Assessment. The several researchers indicated TRI dimensions have significant effects on IS adoption and intention to system use (Lai et. Al, 2004; Liljanderet. Al, 2006). Some of other researchers approved that TRI have significant effect on self-service Technologies such as ATM, e_banking and so on (Lin and Hsieh, 2007; West johnet. Al, 2009; Chen and Li, 2010). Such as shown in figure 1, Parasuraman and collbi (2001) considering different dimensions of TRI, recognized five clusters as briefly below:

- *Explorers* are high inoptimism and innovativeness and low in discomfortand insecurity.
- *Pioneers* are high in optimism,innovativeness, discomfort and insecurity.
- *Skeptics*are low in optimism, innovativeness, discomfort and insecurity.
- *Paranoids* are high in optimism, discomfort and insecurity, but low in innovativeness.
- *Laggards* score low in optimism and innovativeness, but high in discomfort and insecurity.

Table 1. Characteristics of TRI clusters (Parasuraman and Collbi, 2001)

Dimensions name Cluster name	Technology's contributors		Technology's Inhibitors	
	Optimism	Innovativeness	discomfort	insecurity
Explorers	High	High	Low	Low
Pioneers	High	High	High	High
Skeptics	Low	Low	Low	Low
Paranoids	High	Low	Low	High
Laggards	Low	Low	High	High

According to their research, the TR concept is based on following premises: (1) TR does not just refer to possessing technical skills; TR is more a function of people's beliefs and feelings about

technology. (2) People's beliefs can be positive about some aspects of technology but negative about other aspects. (3) The relative strengths of the positive and negative beliefs determine a person's receptivity to

technology. The characteristics of TRI clusters have been showed in table 1.

6. Research methodology

We used TRI questionnaire for acquiring of attitudinal readiness of HR. The Validity of questionnaire has been approved by many Researches. We apply it to Agricultural Jahad organization. This organization has distinctive characteristics in comparison of other governmental service organizations. The gap between Line and office in this organization rarely, is high. It, because of several mission areas, can be led to organization units from process view and content of their tasks; it included almost 14 varied areas from land, animals, agricultural industries, agricultural promotions and so on. It uses different information system such as land development and improvement system, milk's monitoring and management system, plant quarantine system, animal and poultry productions system, office automation system And so on. This organization is largest organization in Qazvin province and has up to 600 employees. The high vertical and horizontal differentiations, varied process proposition's area and seamless between Line and office in this organization, may be direct our research in better manner rather than other organization. In the other hand, the cited characteristics led to a meaningful gap between planning and execution areas and can bring organization in problematic and challenging situation. Hence, HR readiness assessment is critical role in ERP implementation in such organization. The questionnaire has been distributed in organization according to categorical sampling. It applied based on human resource scatter in provinces organization, relative cities units and service centers as last sub-units of organization. The 200 questionnaires have been distributed and 160 have been collected. (equal to 1/3 of population size).

The reliability of research has been approved for all dimensions of TRI. It was for optimism, innovativeness, discomfort and insecurity sequentially: 7.86%, 75%, 75% and 76% according to calculation of cronbach's alpha. The dimensions have been assessed in five points Likert type of scale and the results have been analyzed. For calculating of TRI among employees, we reversed inhibitors item scores (transform them from negative status into positive status) and then calculated average of whole dimensions which have been contributors. In the other hand, Insecurity and discomfort transformed to security and comfort dimensions. Of course in clustering, we used contributors and inhibitors simultaneously without any transforming or

change in collected data. We have three main questions in this research:

- Is there any significant difference between line and office employees' technology readiness?
- Is there any significant difference between young and aged employees' technology readiness considering of employment durations?
- How many clusters there are between organization employees and what are their characteristics?

Each of these questions is useful and beneficial for ERP implementation project planning and management. First question peruses, which of organization areas (line or office) is appropriated for ERP implementation project start. The second question peruses which employees are more ready for ERP implementation. It can be led to their selection for project team of ERP implementation. The third question is more useful rather than others. It recognizes existing clusters of employees' readiness which help organization to acknowledging appropriated strategies for readiness enhancement. Besides, it specifies the organization readiness generally for ERP implementation and does organization enter to ERP implementation or not?

7. Results

7.1 Descriptive statistics

The averaged age of sample is equal to 38 with 9 years of employment duration. Exceed up to %79 respondents are male and remained %21 are female. Considering population size which included only lower than %15 female, it is a good sample. Tables 2 and 3 have indicate the sample size according to their working area and their work nature. These concepts have been defined previously. Such as shown in table 4, organization's human resources have medium readiness for ERP implementation. The employees' contributors for implementation project and system adoption are medium to high. The optimisms attitudes among employees are high and innovativeness behaviors are medium.

The employees' inhibitors for ERP implementation are low to medium. The insecurity and discomfort sense among employees are low to medium. Before any hypothesis testing, we analyze the normality of variables distributions. We used one-sample Kolmogorov-semirnov test. The normality of whole variables has been approved such as table 5 showed. Hence, using of whole analysis with pre-assumption of populations normality are justifiable.

Table 2. Frequencies of respondents according to their work regional

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid services centers	14	8.8	8.8	8.8
cities management	73	45.6	45.6	54.4
organization	73	45.6	45.6	100.0
Total	160	100.0	100.0	

Table 3. Frequencies of respondents according to their work nature

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Line	87	54.4	54.4	54.4
Official	73	45.6	45.6	100.0
Total	160	100.0	100.0	

Table 4. descriptive analysis of research's variables

	N	Minimum	Maximum	Mean	Std. Deviation
1. Optimism	160	2.70	5.00	4.0489	.54251
2. Innovativeness	160	1.57	4.57	3.2473	.57606
3. discomfort	160	1.40	4.30	2.7200	.53948
4. Insecurity	160	1.00	3.89	2.4181	.60647
TRI	160	2.20	4.04	3.1082	.34411
Valid N (listwise)	160				

Table 5. Normality test of research's variables (separated by each dimension)

		Optimism	Innovativeness	Discomfort	Insecurity	TRI
N		160	160	160	160	160
Normal Parameters ^a	Mean	4.0489	3.2473	2.7200	2.4181	3.1082
	Std. Deviation	.54251	.57606	.53948	.60647	.34411
Kolmogorov-Smirnov Z		1.028	.771	.876	.849	.824
Asymp. Sig. (2-tailed)		.241	.592	.427	.467	.506

Table 6. Comparisons of TRI between line and office employees

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
TRI									
Equal variances assumed	8.64	.004	1.36	158	.175	.07426	.05447	-.033	.181
Equal variances not assumed			1.32	125.76	.188	.07426	.05613	-.036	.185

7.2 Inferential statistics

In this section, we analyze research's questions separately and then use the clustering concept for better understanding of existing information.

7.2.1 Technology readiness of line and office employees

The line employees included human resources which complete mission and specialized Tasks. In other hand, the office employees included human resources which perform supportive and indirect Tasks Such as information technology, financial management,

human resource development and so on. If, there is a significant difference between line and office employees readiness, then, it's perfect to implement ERP system in the area which has more readiness. for example, if office area have more ready, its recommended to implement supportive modules of ERP First, such as HR management module and Financial module and then other modules should be implemented after readiness enhancement of employees of specialized area. For analysis of this section, we used two samples T-test (two

Table 7. Comparisons of TRI between different categories of work durations

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.842	2	.421	3.532	.032
Within Groups	17.649	148	.119		
Total	18.491	150			

Table 8. The pairwise Comparisons (Tukey HSD) of TRI between different categories of work duration

First category	Second category	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Medium	.12590	.06421	.126	-.0261	.2779
	High	.18571*	.07467	.037	.0089	.3625
Medium	Low	-.12590	.06421	.126	-.2779	.0261
	High	.05981	.07323	.693	-.1136	.2332
High	Low	-.18571*	.07467	.037	-.3625	-.0089
	Medium	-.05981	.07323	.693	-.2332	.1136

Table 9. Two-step auto clustering of employees

Number of Clusters	Schwarz's Bayesian Criterion (BIC)	BIC Change	Ratio of BIC Changes	Ratio of Distance Measures
1	482.212			
2	442.644	-39.568	1.000	1.671
3	435.267	-7.377	.186	1.119
4	432.994	-2.273	.057	1.301
5	440.650	7.656	-.193	1.651
6	461.294	20.645	-.522	1.343
7	487.032	25.738	-.650	1.167
8	514.895	27.862	-.704	1.074
9	543.635	28.740	-.726	1.094
10	573.398	29.763	-.752	1.030
11	603.476	30.079	-.760	1.053
12	634.080	30.604	-.773	1.527
13	668.133	34.053	-.861	1.044
14	702.459	34.326	-.868	1.034
15	736.990	34.531	-.873	1.223

independent sample) such as shown in table 6. Since, there isn't a significant difference between line and office employees, It isn't preferred or recommended to Implement ERP from specific area (line/office). Note that we define line and office according to Tasks of HR and not to geographical area (service centers, agricultural jahad management of cities and provincial agricultural jahad organization).

7.2 Technology readiness based on employment durations

We have three categories of employment durations: low(1-10 years employment), medium (10-20 years employment) and high (20-30 years employment). Considering these categories, we used Analysis of Variance Technique for comparison of TRI means between them. Such as it has been indicated in Table 7, the significant difference between TRI of different categories of employment durations has been approved. Note that the employment durations are in month units. We used Tukey HSD test for details (see table 8). It indicates, HRs with low work experience and low employment duration have higher TRI in comparison with high employment duration. It is highly conscionable and logical, because the younger employees have more readiness and less resistance to new system adoption.

7.3 clustering of employees' technology readiness

Considering the previous results, it's not recommended to prefer specific area or specific ERPs modules. For acquiring detailed information and readiness planning for weakness points and areas of understudied organization, we clustered TRI of employees according to TRI's dimensions and then

analyze the results. Considering sample size, we used two-step clustering technique. The results have been shown in tables 9 -11. The maximum change in BIC (see table 9) is related to step 2. Hence, the optimum cluster number is equal to 2 clusters. Considering table 11, it's obvious the understudied organization has two cluster of technology readiness. In the first cluster, contributors and inhibitors of TRI are high simultaneously. This cluster refers to "pioneers" which all of four dimensions of TRI are high in them. In the second cluster, optimism and insecurity are high and innovativeness and discomfort are low (rarely). These characteristics are similar to 4th cluster of Parasuraman and Collbi (2001). It is included "Paranoids". Considering recognized clusters and their characteristics, the organization readiness plan should be concentrated on increasing of security sense of IT-based systems. In the other side, organization should be decrease discomfort of IT-based systems and increase innovativeness of employees.

8. Conclusion

In this research, we assess the organization readiness based on HRs' critical role. We emphasized and assessed the HRs' attitudes as a good predictor for organization readiness in governmental service organization. The results showed that HRs have good readiness for ERP implementation project. The clustering of employees indicated that the organization readiness plan should be concentrated on increasing of security sense of IT-based systems. In the other side, organization should be decrease discomfort of IT-based systems and increase

Table 10. The distribution of recognized clusters

		N	% of Combined	% of Total
Cluster	1	88	55.0%	55.0%
	2	72	45.0%	45.0%
	Combined	160	100.0%	100.0%
	Total	160		100.0%

Table 11. The centroids of recognized clusters and their characteristics

	Optimism		Innovativeness		Discomfort		Insecurity		
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
Cluster	1	4.3534	.37669	3.6282	.39020	3.2259	.60046	3.4987	.61484
	2	3.6767	.47940	2.7817	.39614	3.3510	.46499	3.6863	.58880
	Combined	4.0489	.54251	3.2473	.57606	3.2822	.54565	3.5832	.60862

innovativeness of employees. Organization should be focuses on younger employees for team project's composition rather than champion role by older. Since, there isn't significant difference between line and official employees, it's not recommended to implement ERP partially.

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