THE ROLE OF HRM IN IT INNOVATION: AN INVESTIGATION AND STUDY OF THE RELATIONSHIP BETWEEN IT PROJECTS AND HRM IN FOUR TURKISH COMPANIES

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Abstract
The concepts of change, competition, and strategy gained importance in the 1980s and technological innovation was the strongest factor shaping society with respect to those concepts during the same period. Particularly after the 1990s, the capacity of a business to create innovation began to be seen as a crucial key to its success. One of the fundamental reasons why innovation-related academic studies and practices focused on innovations in information technology was that information technology was itself the scene of rapid development during the early 2000s.
At a time when achieving a competitive edge is dependent on superior knowledge and innovativeness, people are undeniably the most crucial elements of learning, creativity, and innovation. The introduction of innovation of every kind should first of all be dealt with as a problem of change management and the role and functions of human resources management (HRM) should be reconsidered when innovations are to be introduced.
In this study, various dimensions of the relationship between technological innovation and HRM were assessed within a theoretical framework in order to discover the contribution that HRM HAS made towards information technology (IT) innovation. In this study, the main objective was to see how these dimensions were shaped from the standpoint of IT innovations. To accomplish this, the contributions that HRM made towards the IT projects of four companies that are regarded as leaders in their respective sectors were queried through face-to-face discussions with the human resources managers and the human resources planning and performance evaluation officers of those companies.
The conclusion reached through this theoretical framework-based examination of the relationship between IT projects and HRM in these four companies introducing new IT systems is that while it is not possible to advance any generalizations, the companies in the study adhered to the requirements that had been debated on a theoretical basis.

Keywords*: Innovation, Technology, Information Technology, Human Resource Management*

1 HRM PRACTICES AND IT INNOVATION

Innovation is an important factor in two key ways for organizations: it plays a role both in radical developments (Colewell, 1996) and in smaller, continuous changes (Bessant, 1992). Forrester (1994) has revealed a number of different techniques deployed by organizations to either select or promote innovation amongst their workforces. Based on recent evidence, it is

said that innovation activities are very important for organizations and that human resource policies must support innovation activities (Searle & Ball, 2003; 4).
Innovation and HRM seem to be closely connected with each other. In most of the literature on innovation and its management, there is considerable attention given to HRM issues (Leede & Looise, 2005; 108).
Looise & van Reimsdijk (2004) gives the concept of HRM innovation (Looise & van Reimsdijk, 2004; 284), Chung (1997) addresses specific tools and practices for the role of HR in promoting technological innovation and Sauer (1999) has revealed twelve so-called factor classes that were dominant in the IT literature as potential causes of failure if ignored (Bandarouk & Looise, 2005; 161-162). These three crucial points showing the importance of human resources and management in the practical implementation of technological innovations in organizations are presented in Table 1.

Operationalization of HR Practices for an IT Innovation	Tools and Practices for the Role of HR in Promoting Technological Innovation	Managerial Practices for IT Innovation
New organization and job design	Human-centered technological philosophy	User involvement
		Management commitment
	High-level management individual	Vale bases
New forms of human resource flow		Mutual understanding
	Worker involvement	Design quality
		Performance level
New forms of communication and participation	Pilot-level technological projects	Project management
		Resource adequacy
	Re-organization	Situational stability
New forms of performance and reward		Management process
	Empowerment	Implementation process
		Individual differences

Table 1. Managerial and Human Resources Factors for IT Innovation
Source: Adapted from Chung (1997), Sauer (1999) (from Looise & van Reimsdijk 2004), Looise & van Reimsdijk (2004).

2 AN INVESTIGATION ON THE ROLE OF HRM IN IT INNOVATION

The main purpose of this research is to analyze to what extent the relation between technological innovations in the field of IT and different dimensions of HRM is put into practice. With this aim, four companies, which are accepted as pioneers in their own sectors, are interrogated via the interviews done with human resources managers, authorities responsible for human resources planning and performance evaluations. In each of the four companies' individual and group interviews are made and each interview lasted for about 100 minutes.
Interviews were made in semi-structured form. In the form prepared to use in the interview there were questions to identify manager and business, and also there were questions to examine the establishment and operation process of IT used in the business and also there were questions to interrogate the role of HR. An evaluation scale which is developed by using five fold Likert Scale, is used to interrogate the relation between IT and HRM and the

managers are asked to fill in the form accordingly. The factors related to innovations in IT and the factors related HRM are all examined one by one. While preparing the interview form the works of Chung (1997), Sauer (1999) (from Looise and van Reimsdijk 2004), Looise and Reimsdijk (2004) are benefited from.
As a result of the interviews done by the managers, generally, information is obtained about the new IT which has been newly used, the reasons for transferring into new IT system is examined, the process in which installation of the system and adaptation and the exploration are made to learn the kinds of studies made to adapt the system with the help of human resources management.
In the end of interviews, interview notes are analyzed and deductions are made accordingly. The names of the companies are not given in this study; however explanatory information is given about their field of activity and organizational structures.

2.1 Case 1: SAP Project in Holding 'A' and HRM Applications

Holding 'A', the foundations of which are made in air system, is transferred into holding formation by ad in tourism&traveling agencies and adding food companies into its constitution.
Holding A which has realized information sharing and data process within the company with the help of momentum programming automation program until the year 2000, needed to make an innovation to pick up the information in one hand and to transfer the matters of pertaining to personnel into automation. With this aim a project team is made and a necessity analysis is made in the basis of companies and holding in general. The old and the new system are used at the same time for two months to check the processes. By the year 2006 SAP system has been used in human resources management, financial affairs, budgeting and maintenance.
SAP system was accepted because of the growth of the holding, the power of SAP to file, the possibilities to do on-line processing, the developable structure of the system. At present there are 125 licensed SAP users.
A project team is made when first decided to use the new information technology in the holding and an advisor from the SAP is asked. In the first module of system which is HR, the help of HR department was of big importance but in the second module which is payrolling, data processing department was responsible. The training about the new program is given both by the SAP advisor and also by the in-service trainers and all the personnel is provided with the information to get to know the system to enter data.

	5 = Strong 4 = Moderately Strong 3 = Moderate 2 = Mostly Weak 1 = Weak	**5**	**4**	**3**	**2**	**1**
New Organization & Job Design	explicit definitions of tasks to be automated by new IT		*			
	definitions of responsibilities and boundaries		*			
	(re)-structuring of team work	*				
	establishing new working time to learn and practice with IT		*			
New Forms of HR Flow	recruiting policy oriented to complexity and radical ness of new IT			*		
	career development plans with respect to new forms of working with IT			*		
New Forms of Communication & Participation	users' participation in the decision making in the IT projects	*				
	authority of the users to communicate with an IT supplier	*				
	developing regulations to provide newcomers with information about IT innovation	*				
	users' contribution in defining their training needs	*				
	adequacy of training sessions	*				
	adequacy and availability of material resources to learn IT	*				
New Forms of Performance & Reward	regularity of evaluation of the use of IT				*	
	recognition of progress in use of the system				*	
	rewards, reorganizations of the pay system for the users				*	

Table 1. 'A' Holding's Operationalization of HR Practices for IT Innovation

The main reason for being transferred into SAP system was the former system used to do processes only in main functions (financial affairs and filing). The growth of the company, the placement of companies in a common platform and the need for doing online transactions forced the innovation of the new system. With the SAP system, expectations came true; the possibility to work in more than one workstation and in different centers was carried out.

In the first applications done in the air transportation distributing the main duties to workstations was enabled by the design of a new organization. Data entries used to be done separately in the workstations are now being done in both unit basis and in main centre. Accessing the intra vires information between the user codes and stations were the structures within the system. Human resources in the unit were authorized intra vires fort he data flow both in their locations and other locations.

Participation was an important factor in the adaptation of the new system. System users got permanent consultancy about the system from both SAP advisors and the project team in the company. Continuous communication and permanent training, system and user adaptation realized without any problems.

After the installation of the system a general evaluation and performance system in company and holding basis is not done. An application is weak to check the performance of the users and increasing performance.
Holding put SAP into practice without making any radical changes. New information technology is advantageous thanks to its design which is apt to existing organization structure. Although the structure of the company was not renewed completely, when workstations and the connections between companies are considered it means a new design thanks to common information platform and data flow. At the same time, handling communication structure together with information came up as a necessity and it became an efficiency increasing component.
Benefit and value based perception of the holding management and sub- management were the most facilitating component of all. The usual reaction and resistance of the human resources were seen normal. The reason for the reaction was the process during the installation of the system and the increase in the individual responsibilities after the installation of the system and understanding the reality that there are no more excuses for delays because all the transactions are done on-line.
In summary, IT innovation in holding A is clearly supported by HRM. There was a complete support in the process of system installation. Trainings to employees are both given by SAP and HR department. There was a support from the HR in the design of the organization and especially it took a leading role in restructuring the communication. Human resource that the system will need is re- identified by the HR department; recruiting and the adaptation of the current employees to work are realized by HRM applications.

2.2 Case 2: SAP Project in Holding 'B' and HRM Applications

Founded in 1930 and structured in 1981 holding 'B' presents goods and services in world quality with its companies ranging from construction, energy, textile, finance, and it has customers ranging from international companies and individuals.
Holding B is one of the Turkey's leading companies with its 15000 employees and its companies in different sectors it needs an integrated management. The company passed to SAP system in 2005 to sum all processes in one hand and to gain efficient control. In all the companies in the holding and in the holding itself modules of finance, accounting, project management, MRP, HR, cost accounting, sale distribution are used.
Holding B is the second in the world in the area of textile and denim and it is the first company to use SAP.
Holding B, which is the second biggest company in denim production, is the first company to use SAP in the area of textile and construction.
With the studies started o construct processes in 2003 the processes are adapted by comparing the processes of the holding. After the test studies done 3 times SAP was started to be used with its 300 licensed users.
The holding being activated in different geographical regions, the processes being complicated, and every company using different and disintegrated BT system made the information flow, communication and control harder. There occurred a necessity to adapt a new information technology to sum up the data correctly and strengthen the information flow and communication. The main goal was an innovation to make control focus stronger. With this aim, SAP project was put into life in all the companies within the holding. All the modules (finance, accounting, project management, MRP, HR, cost accounting, stocking, sale-distribution) of the SAP project started in all the companies and the center of the holding.

	5 = Strong 4 = Moderately Strong 3 = Moderate 2 = Mostly Weak 1 = Weak	**5**	**4**	**3**	**2**	**1**
New Organization & Job Design	explicit definitions of tasks to be automated by new IT		*			
	definitions of responsibilities and boundaries	*				
	(re)-structuring of team work		*			
	establishing new working time to learn and practice with IT		*			
New Forms of HR Flow	recruiting policy oriented to complexity and radical ness of new IT		*			
	career development plans with respect to new forms of working with IT		*			
New Forms of Communication & Participation	users' participation in the decision making in the IT projects		*			
	authority of the users to communicate with an IT supplier		*			
	developing regulations to provide newcomers with information about IT innovation	*				
	users' contribution in defining their training needs	*				
	adequacy of training sessions	*				
	adequacy and availability of material resources to learn IT	*				
New Forms of Performance & Reward	regularity of evaluation of the use of IT		*			
	recognition of progress in use of the system		*			
	rewards, reorganizations of the pay system for the users	*				

Table 3. 'B' Holding's Operationalization of HR Practices for IT Innovation

In 2003, with the decision which expresses the necessity to make innovations in information technologies in all the companies, SAP project was started in July. In the beginning process of the project the managers listened to the presentations of ERP software producers. After each presentation, an evaluation meeting was made and they examined the companies and software's as to their appliance to the company.

As a result of the evaluation meetings, SAP was chosen in the last step. Process maps were examined and they decided to change some processes but keep some of them same. They reevaluated the processes again and asked for what can be done to improve these processes and it was decided that SAP was the best for Holding B.

For the IT innovation project, an 80 people team was made and they were all responsible for all these processes. Team's preferential study was on conceptual design and common process maps were made by comparing the processes of the holding. The second step was to learn how to use SAP software and adaptation of the processes to the system. After recording the necessary programs and modifying the processes 3 tests were made to check the operation of the system before January 2005. After the success gained after the tests On January 2005 the new IT system was started to be used.

In the installation process of the system, there was a resistance like in all changes in human resources. System being known by all office workers and all managers caused this kind of reaction. The reaction was demolished by the decisive approach of the top managers and their explanations about the necessity of the system during the meetings.
Management gave a special importance to adaptation of the human resources into the new system. Therefore, one-week trainings were given. In these trainings it was explained what IT was, the reason for making innovations in the system, what their modules are. The average age of the employees were low which one of the facilitating factors was. The employees accepted to be the part of this system as they were told that learning this system would help their career development and the management promised to give them full support during this process. The definite goals, decisive attitude of the managers helped the system to be quickly adapted.
In the new system, which had been put into practice, all the responsibilities of the users and employees were clearly defined. In the light of these clear job descriptions, the required human resource is clearly defined. While giving trainings to current human resource to adapt them to the new system, newly recruited human resource is being chosen according to the new system. As a last user everyone has to know SAP system in the companies and holding. Manuals are prepared for every module and employees were supported by the trainings given by a member of the project team or the holding itself.
With the new system the participation of employees to the decisions made increased in proportion to their level of knowledge and their positions. So, their interest in work increased and they had an opportunity for their career development.
In SAP system, process maps were prepared bearing in mind the applications in the world. The processes of the holding and companies were chosen before they had been comparing to the world's best applications. For instance, production module was adapted from Daimler – Chrysler.
SAP system was first used by holding B in the area of construction and textile. Another first in Turkey is the usage of 'management cockpit'. The operation principle of the system is its presentation of the most critical and summarized report among thousands of data and reports.
IT innovation project had not been thought about in such a detailed way at the beginning; however, after the project was started the necessity to innovate all processes and companies was decided in a very short time. In the stage of transferring into the new system some employees resigned from their jobs of their own accord as they had thought that they could not adapt themselves into the new system. As a result, with the people embracing their company, giving importance to career development, being open – minded about technological developments Holding B put the IT innovation into practice without any problem.
In putting SAP into life, both HR department and HRM applications of the holding seem to support the innovation of IT. The project team formed in the selection and installation of the system and achieving participation are of great importance in HRM. The trainings given to adapt the current human resource into the new system and trainings given to be a system user are seen as HRM applications making career developments and defining duties and responsibilities and clarifying the operation of the system. Besides, necessary changes are made in accordance with the new IT system in the principles of recruitment of new staff.

2.3 Case 3: ORACLE Project in Bank 'C' and HRM Applications

By the end of the year 2005, Bank 'C' was the fourth biggest bank in Turkey. Activating in commercial, institutional and individual banking, Bank C has been activating in Turkey since

the year 1942 with its 472 domestic, 8 foreign branch offices in 8 countries with 9128 employees.
First being introduced to Oracle in 1998 first started to use human resources module in 2003. It has 40 licensed users in HR department. Oracle system, which is preferred for filing training data and reporting, was started to be used after creating codes, Oracle trainings, transferring former data and updating the system in 6 month's time.

	5 = Strong 4 = Moderately Strong 3 = Moderate 2 = Mostly Weak 1 = Weak	**5**	**4**	**3**	**2**	**1**
New Organization & Job Design	explicit definitions of tasks to be automated by new IT			*		
	definitions of responsibilities and boundaries		*			
	(re)-structuring of team work		*			
	establishing new working time to learn and practice with IT		*			
New Forms of HR Flow	recruiting policy oriented to complexity and radical ness of new IT		*			
	career development plans with respect to new forms of working with IT		*			
New Forms of Communication & Participation	users' participation in the decision making in the IT projects		*			
	authority of the users to communicate with an IT supplier	*				
	developing regulations to provide newcomers with information about IT innovation	*				
	users' contribution in defining their training needs		*			
	adequacy of training sessions	*				
	adequacy and availability of material resources to learn IT	*				
New Forms of Performance & Reward	regularity of evaluation of the use of IT	*				
	recognition of progress in use of the system			*		
	rewards, reorganizations of the pay system for the users			*		

Table 4. 'C' Bank's Operationalization of HR Practices for IT Innovation

The Bank which has been a pioneer in many firsts in Turkey aimed to use human resource project and IT in a more efficient way especially in the year 2003. The data of the trainings given in HR being sorted out immediately and correctly by the current young and dynamic human resource made the realization of the new system faster.
Before the application of Oracle system HR module, the processes were examined in 6 month time and during this time; the operations such as coding, trainings of the employees, preparing the old data by stocking for the new system were made. After all these steps, the new system was started to be used.

Bank C being aware of the value of the human factor in many innovations brings about the support of human resource in a great extent. There is not any resistance to the new system by the employees and it was accepted completely. At this point, management attitude and facilitators within the organization are seen as main factors.
The employees could watch and update all of their personnel matters such as; CV and payroll with the help of 'HR online 'system. Process and information share rate of the system facilitated the, individualization of the IT system innovations by the employees.
The employees of Bank C get information about the system thanks to IT department placed in every unit and also they are adapted to the system by the trainings given by Oracle and bank project team.
Bank C shows an organization structure and managerial conception which quickly adapts itself to technological innovations and changes. So Oracle which is an IT innovation worked really well in Bank C. Trainings and HR recruiting principles were the basic points supporting the application of the system. Especially, the applications being done on-line give a dynamism to the system.

2.4 Case 4: HUMANIST Project in Bank 'D' and HRM Applications

Formed as a combination of 7 banks, Bank D is the Turkey's eleventh biggest bank with its 307 branch offices and 4585 employees. First of all HUMANIST which was started to use in HR department, aims to develop online transactions. Designed according to the bank's processes, the system was started to be used in 2002. Consistently changing and updating according to the needs of the bank the system has 30 licensed users.

	5 = Strong 4 = Moderately Strong 3 = Moderate 2 = Mostly Weak 1 = Weak	**5**	**4**	**3**	**2**	**1**
New Organization & Job Design	explicit definitions of tasks to be automated by new IT		*			
	definitions of responsibilities and boundaries	*				
	(re)-structring of team work		*			
	establishing new working time to learn and practice with IT		*			
New Forms of HR Flow	recruiting policy oriented to complexity and radical ness of new IT			*		
	career development plans with respect to new forms of working with IT			*		
New Forms of Communication & Participation	users' participation in the decision making in the IT projects			*		
	authority of the users to communicate with an IT supplier			*		
	developing regulations to provide newcomers with information about IT innovation	*				
	users' contribution in defining their training needs		*			
	adequacy of training sessions		*			
	adequacy and availability of material resources to learn IT		*			
New Forms of Performance & Reward	regularity of evaluation of the use of IT				*	
	recognition of progress in use of the system				*	
	rewards, reorganizations of the pay system for the users				*	

Table 5. 'D' Bank's Operationalization of HR Practices for IT Innovation

Bank D needed a communication and data flow reconstruction with its branch offices all around Turkey and number of employees. For this reason the bank started the preparations for the system reconstruction with 30 people project team. In managerial meaning, especially HR department was the basic starting point for the IT innovation.

Seven different programs were used in the old system because of the uniting of different banks. The research for a system to link all these different programs in one platform brought about the IT innovation project. With this aim, for responding price and necessities there came the software humanistic system of which was chosen.

Work process of the bank has changed as to the necessities and modifications and IT system has been adapted to these new processes. Detailing of some modules and the orientation of the processes to on-line and multiple users were the basic innovations of the new system.

For the system which has been used since 2002, a 7 day 24 hour support service is taken to adapt the employees working in HR IT system. Newly recruited human resource is being trained as they are processing via the sector's computer programmers. Besides, beginner and user trainings are given both by system software experts and the experts of the bank's data

processing department. Adaptation of the new system to the bank didn't come up with any reactions. In direct contradiction,
Facilitating the employees' burden was one of the facilitating factors in the coordination of the system and human resources.
Goals being definite, long working hours, adaptation of the new system by the employees brought about the success of the IT innovation in Bank D with the support of the human resources and participation.
Bank D, with its many branch offices and many employees, seems to have a powerful construction. However; supporting this powerful construction with technology is crucial as to the sector in which the company has placed. For this reason, innovations in the bank are made with consistent updates. In the innovation made in banking transactions and in administrative management HRM department and data processing department forms the main points. Permanent trainings are given to the employees to use the system whenever necessary and to be a basis for consultation .The employees being aware of the necessity of the new system didn't give any reactions and HRM applications mostly tended to develop the system by not focusing on the acceptations of the new system by the human resource.

CONCLUSION

The meaning of the competition has changed in the era of information. The most important instrument for the companies is aiming competition precedence.
Innovation by using information and creating better values then their competitors will increase their competitive performance. The turning point of the information era is the innovations in information and communication developments. Companies aiming to be successful should immediately adapt themselves in order to benefit from the information. It shouldn't be forgotten that in all innovative efforts and in especially in bringing IT innovations into life applications of HRM plays a crucial role.
In this study, IT innovations explained theoretically, their reflections in the application related to HRM are interrogated with the research which is conducted by IT projects. The researches done showed the importance of human resources and management applications when transferring into a new system. In all the companies examined HRM support is taken to adapt the new system into organization and for the orientation of the human resource. The systems chosen for the companies aimed the best fit for the companies' processes and better efficiency of the human resource.

Operationalization of HR Practices for an IT Innovation	SAP Project		ORACLE Project	HUMANIST Project
	Case I	Case II	Case III	Case IV
New organization and job design	+	+	+	+
New forms of human resource flow	+	+/-	+	+/-
New forms of communication and participation	++	++	+	+
New forms of performance and reward	+	-	+/-	-
Tools and Practices for the Role of HR in Promoting Technological Innovation	**SAP Project**		**ORACLE Project**	**HUMANIST Project**
	Case I	**Case II**	**Case III**	**Case IV**
Human-centered technological philosophy	+	++	++	+
Managers who are knowledgeable about technology	+/-	++	++	+
Worker involvement	++	+	++	+/-
Pilot-level technological projects	++	++	+	+
Re-organization	+	++	++	+/-
Empowerment	+	++	+	+/-
Managerial Practices for IT Innovation	**SAP Project**		**ORACLE Project**	**HUMANIST Project**
	Case I	**Case II**	**Case III**	**Case IV**
User involvement	++	++	++	+/-
Management commitment	++	++	++	+
Value bases	+	++	++	+
Mutual understanding	++	++	++	+
Design quality	+	++	++	+
Performance level	+	-	+/-	-
Project management	+	++	+	++
Resource adequacy	++	+	++	++
Situational stability	+	+	+	+/-
Management process	+	+	++	+
Implementation process	+	++	+	++
Individual differences	+	+	+	+

++ strong, + moderately strong, +/- moderate, - mostly weak, - - weak

Table 6. Turkish Firm's Factors Role of HRM and Management Practices in IT Innovation Implementation

These four case studies show the following:

- The reasons for choosing IT innovation generally stem from the inadequacies of older systems in the areas of information storage, compilation, and reporting. New IT systems are preferred because of their convenience: No matter what unit they may be in, all authorized users are able to access and process information online.

- New IT system processes are designed taking into account an organization's existing processes. The question of which system will be the most useful is addressed by analyzing existing processes and deciding which system will create added value for the organization.
- After the new IT system has undergone initial testing and is available for use, users are familiarized with the system by means of in-house training.
- New organization and job design, forms of human resource flow, and forms of communication and participation are strong in these Turkish firms but there is still a need to improve management practices in performance and reward systems.
- The firms have a human-centered technology philosophy and their managers are progressive on the subject of technology. Employee involvement is important for these firms and they introduce new technology by means of pilot projects. Most reorganize themselves for the IT innovation and workers are empowered in this process as well.
- Management commitment is very important in IT projects and these firms show this strongly. Systems are designed after processes have been analyzed in detail. Values are determined and realized with an approach that supports management change and development. However, evaluations of systems' and employees' performance are not a common practice as yet and this should be considered a deficiency at the present time.

As this was simply a preliminary study in which only the firms' conformity with factors defined in the literature was considered, it does not offer many opportunities to make generalizations. However in view of the dimensions of the firms examined, this study does suggest that the tenets advanced in theory are in fact genuine in practice.
In the future, this study could be expanded in order to reveal characteristic features of different sectors and also to make comparisons among national and cultural differences.

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