AMERICAN UNIVERSITY OF ARMENIA

THE ROLE OF INFORMATION TECHNOLOGIES (IT) IN HUMAN RESOURCES MANAGEMENT (HRM) OF ARMENIAN PUBLIC AND PRIVATE ORGANIZATIONS

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GOHAR GRIGORYAN

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SIGNATURE PAGE

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Faculty Advisor   Date

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Dean   Date

American University of Armenia

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ABSTRACT

This study compares public and private organizations of Armenia in terms of level of automation of HR activities. It also explores the different types of impacts that information technology (IT) has on HR activities. Snell et al. (2001) mention three types of impacts of IT on HR activities. There is an operational impact when IT improves operational efficiency of HR by automating routine activities, decreasing costs and increasing productivity. Relational impact influences HR department's relationships with other parties within the organization. Finally, the transformational impact of IT includes changes in the scope and function of the HR department.

The study explores whether:

(H1): the level of automation of HR activities is higher in private organizations than it is in public organizations of Armenia;

(H2): the level of automation of HR activities in Armenian organizations is correlated with the transformational impact of IT in the organizations.

Four organizations in Armenia are used for a comparative case study - two public and two private – with each group having a foreign entity as well.

The study has found that the level of automation of HR activities is higher in public sector organizations than it is in private sector organizations. The highest operational, relational and transformational scores were recorded in public organizations, where also the level of automation was the highest.

The study also confirmed the hypothesis on correlation between the size of the organizations and the transformational score. The essay ends with discussion on the limitations of the exploratory research, arguing for a research based on a larger sample.

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INTRODUCTION

In the age of globalization, with information technologies continuously expanding their domain one cannot ignore their role in organizations. While research comparing public and private organizations in terms of information systems is not large, this fact does not belittle the role of information technologies in organizations. Many organizations transform their Human resources management (HRM) functions from the manual to the computerized work processes by using Human Resource Information Systems (HRIS), which often influence structures and management styles of organizations.

In the Republic of Armenia information technologies are used both in public and private sectors though not so widely as in developed countries of the world. However, IT is applied in Armenian organizations and has different level of effectiveness in HRM of organizations. This study will try to explore different types of impact that IT has on HR activities and to find out whether there are differences in the use of information technologies in HRM in public and private organizations of Armenia.

THEORETICAL BACKGROUND

Human Resources Management (HRM). Human resources management (HRM) deals with the human side of the management of organizations and employees' relations with their firms. Its main goal is to ensure that the employees of an enterprise work in such a way that the employer obtains the greatest possible benefit from their abilities and the employees get both material and psychological rewards from their work. Human resources are more difficult to manage than material resources because of disagreements between the employer's and employees' needs and requirements (Graham & Bennett, 1998).

Researchers at the Harvard Business School developed the four Cs model of HRM according to which one should evaluate the effectiveness of the outcomes in HRM under four criteria: commitment, competence, congruence and cost-effectiveness (Graham & Bennett, 1998).

Commitment concerns employees' loyalty to the organization, personal motivation and liking for their work. The level of employee commitment can be estimated via attitude surveys, labor turnover and absenteeism statistics.

Competence deals with employees' skills and abilities, training requirements and potential for higher-level work. These can be assessed through employee appraisal systems. HR specialists should organize HRM policies in a way to attract, retain and motivate workers.

Congruence means that management and workers have the same vision of the organization's goals and work together to reach them. If an organization is managed well the employees at all levels of authority will share common perspectives about the organization's future plans and prosperity. On their day-to-day operations workers should feel that they have

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common objectives. Congruence is obvious in the absence of grievances and conflicts within the organization.

Cost-effectiveness concerns operational efficiency of human resources. Organizations should use their human resources to their best advantage and in the most productive ways. An organization should try to maximize its output by the lowest input cost (Graham & Bennett, 1998).

The structure of an HR department should depend on the importance of the different tasks it carries out, which in turn depends on the organization of the firm – its size and complexity, production technology, degree of bureaucracy and tradition. In some HR departments work is shared equally among the HR officers, and when any problem occurs the officer who becomes free is assigned to solve it. This explains the generic nature of personnel work. Alternatively, an HR department can be organized according to particular functions, with separate staff and sections responsible for recruitment, industrial relations, welfare services, personnel records, etc. Such functional organization allows staff to specialize in a certain area and develop great expertise in that field (Graham & Bennett, 1998).

According to Ulrich (1997, in Pynes 2002) there are four major HRM roles: management of firm infrastructure, management of employee contribution, management of strategic human resources, and management of transformation and change (p. 94).

The management of firm infrastructure refers to routine activities such as recruitment and selection, administering employment benefits, handling grievances and making sure that employees are pain on time. These activities are important for administrative purposes but do not enable organizations to meet future challenges (Pynes, 2002).

The management of employee contribution role refers to the communication responsibilities related to listening and replying to employee concerns. Here the task of HRM professionals is to make sure that employees are engaged and committed to the organization

by offering them opportunities for personal and professional growth and by training line managers in achieving and maintaining high employee morale.

The management of strategic human resources role refers to the accomplishment of human resource activities, policies, and practices to make the necessary changes in order to improve the organization's operational and strategic goals. This role focuses on the implementation of new or revised human resource management practices.

In the management of transformation and change role the HRM department serves as 'a change agent' (Pynes 2002, 94). Here new HRM practices and systems accompany new organizational structures and may also accompany the cultural transformation of the organization. This happens when an organization decides to totally change the nature of its HRM practices, its organizational structure, and its organizational culture in order to support strategic change.

Snell, Stueber and Lepak (2001) state that there are four main goals that make HR departments competitive. First, they should be more strategic. As it is noted, to become more competitive the bottom-line business of human resources must be the delivery and/or development of human capital.

In order to become a strategic business partner HR department should be involved in the development, planning, formation and implementation of competency-based strategies. Unfortunately, according to the recent studies by the Hackett Group (1998 in Snell et al., 2001) in 1050 companies, HR professionals devote less than a third of their time to the most essential strategic HR initiatives.

Second, HR functions should be more flexible (Wright & Snell, 1999 in Snell et al. 2001). About 1700 HR professionals indicated that change management was the main skill that had increased most in importance (Employee Benefit Plan Review, 1997 in Snell et al.,

2001). According to a large body of research, strategically focused and flexible to changes firms are the most successful ones.

The third priority for HR functions is to equally distribute their costs. The typical US organization in the 1990s spent approximately 1500 USD annually per employee on HR-related issues, but this amount can be double or triple in less efficient organizations (Employee Benefit Plan Review, 1997 in Snell et al., 2001). Researchers asked managers to prioritize where they can best utilize their time, talents, and resources, and where they can find places to cut. Such cost restrictions are commonplace in strategic HR.

The fourth point is to provide managers and employees with excellent service. Meanwhile, the responsibility for employment relationships will remain to be the function of HR.

In short, HR departments should be strategic, flexible, cost-efficient, and customer oriented. In order to achieve all these goals a totally different approach to HR organization is required. "A virtual HR department is a network-based structure built on partnerships and mediated by information technologies to help the organization acquire, develop, and deploy intellectual capital" (Snell et al. 2001, 6).

Snell et al. (2001) draw parallels between virtual memory of computer and virtual organization. Computers use peripheral storage devices such as hard drive to enhance its active memory (RAM). "The benefit of "virtual memory" is that an operating system such as Windows can manage the swapping of data between the hard disk and active storage so that it appears to the user as if the computer has far more active memory than it actually does" (Snell et al. 2001, 7).

Davidow & Malone state that firms concentrate on their main abilities and outsource peripheral work to other firms, meanwhile managing the network (1992 in Snell et al., 2001).

In this way these virtual firms are able to simultaneously raise efficiency and flexibility. Moreover, it appears that the organization can do "anything, anytime, anywhere".

To manage to be more flexible and focused most firms have increased their reliance on external sources to perform part, if not all, of these activities (Brenner, 1996 in Snell et al., 2001). To the (internal) customer, the HR department increases its service capabilities while cutting costs, enhancing flexibility and speed. Snell

Information Technology (IT) in Human Resource Management (HRM). Globalization, intellectual capital, and information technology are expanding the frame of organizations (Snell et al., 2001) as a result of which structures and management styles of the organizations are also changing (Pynes, 1997). Most of these changes are likely to take place in human resource (HR) departments supporting to expand organizational innovations (Snell et al., 2001). Many organizations transform their Human Resource Management (HRM) operations from the manual to the computerized work processes by using Human Resource Information Systems (HRIS).

By 1950, in all organizations records (payroll, benefits, etc.) were traditionally produced by manual-mechanical methods like typewriter. In the middle of 1950s when the second-generation computers emerged, it became possible to computerize not only electromechanical activities but also some non-automated record keeping. At that time computer applications were used for simple arithmetic operations such as counting, storing, and sorting (Siegel and Myrtle, 1985). Today information technology is used not only to automate routine tasks but also "to restructure and integrate service delivery procedures and programs" (Pynes 1997, 11).

As technological changes are taking place in HR departments also, this process has influence on the tasks of HRM specialists. Now people use computers to carry out many of

the functions for which employees were once responsible such as to advertise job vacancies in public places, to replace interpersonal screening and interviewing. Many civil service systems use computerized testing which makes the recruitment, selection and other functions easier and quicker. Organizations use computer programs also for salary administration and performance evaluation (Pynes, 1997).

Impact of IT on HR. The development of computer technologies has both positive and negative influence on the structures of organizations and working teams. On the one hand, new technologies give employees wide opportunities to work at different geographic locations and to communicate with each other through e-mail, tele- and videoconferencing (Pynes, 1997). On the other hand, the increasing use of technology reduces face-to-face personal interactions "by replacing interpersonal communication with impersonal electronic communication systems such as computer networks, electronic mail, or fax messages" (Halachmi 1991, 244). As a result interpersonal relationships necessary for the organization may start to weaken gradually (Pynes, 1997).

Another negative impact of information technologies is invasions of work privacy. Though computer technology is used for observing employee performance and efficiency there are concerns that it makes possible to count the number of keystrokes per minute input (Pynes, 1997).

The expansion of technology in the workplace may have negative impact on employees' skills. As Pynes (1997) puts it: "Technology must be used to expand skills and responsibilities, not to narrow them" (p. 292). The electronic exchange of information can be used by the employee to report supervisors which, again, diminishes the frequency of face-to-face interaction and feedback. With reducing feedback the employee will have fewer opportunities to improve his/her knowledge or understand supervisors' goals. Accordingly,

rather than making performance better, electronic communication may hinder the functioning of the organization (Halachmi, 1991).

New information technology can have negative influence while facilitating the separation of authority from responsibility in a way that employees may start to ignore the formal structure of the organization. By using e-mail, voice mail and networks the employee has an opportunity to ask for help from other employees of the organization to handle more complex tasks without asking for help from a supervisor (Halachmi 1991).

Snell et al. (2001) discuss three main influences of IT on HR: operational impact, relational impact and transformational impact. Talking about the operational impact of IT the authors mean that IT improves operational efficiency of HR by automating routine activities, decreasing costs and increasing productivity. Applications that make transaction processing easier and computation activities can increase the volume of work that an employee can do. And by reducing paperwork, automated systems may have influence on eliminating headcount of staff. However, in order to raise the productivity specialists should redesign the HR processes that they are using.

The nature of relationships between HR and line managers and employees can also be changed during the reengineering of HR processes. And this is called relational impact of IT (Snell et al., 2001). By providing line managers and employees with remote access to HR systems, IT supports them to make decisions in HR-related issues and gives opportunities to connect with other parts of the organization. By providing on-line access of information HR can reduce waste, improve decision quality, cut cycle time, and increase flexibility.

However, Huber (1990, in Snell et al., 2001) brings counter-argument to this statement by saying that IT may shift the burden of administration back to line personnel overloading them with irrelevant and non-interpretable data hindering the productivity of line managers.

The transformational impact of IT includes changes in the scope and function of the HR department. For example, by using intranet-based technologies it becomes possible to organize worldwide virtual meetings of HR professionals from different countries. This is of vital importance for multinational organizations whose HR activities are extremely expansive and who try to coordinate activities worldwide. Problems of coordination and control may occur when business units do not get enough information and knowledge. However, organizations can overcome these problems if appropriate technologies are used (Snell et al., 2001).

The vivid example of HR transformation one can see in the evolution of education and training. Specialists develop new approaches to knowledge management instead of using traditional approaches to learning such as combining traditional classroom experiences with web-based e-learning opportunities. For example, "Merck's Leadership Development Program uses an on-line 360 degree diagnostic, called Performance Compass, which helps managers assess their developmental needs and then connects them to wide array of external training and educational resources" (Snell et al. 2001, 14). By using these kind of systems employees can online search and find information they need for learning. This decreases research time and cost that is needed for producing and distributing hardcopy of the material. What is more important, these systems facilitate the process of employee development "by bringing the training to the employees, rather than vice versa" (Herren 1989, in Snell et. al. 2001, 14).

Organizations while introducing new technology should be ready to spend money and time to train and develop new skills in the employees (Pynes, 1997). To follow the changes in technology new technology users must upgrade equipment and make more changes in organizational structures and work procedures (Halachmi, 1991). This process requires investments and to reduce the cost of investments a framework should be developed defining

how HR information technology can help achieve competitive objectives (Broderick and Boudreau, 1992).

The HRIS Development and Implementation. Rodger, Pendharkar, Paper & Molnar (1998) suggest that concentration on communicating and educating users to become aware of the value-added potential of HRIS will promote to the development and implementation stages of HRIS. Likewise, Gara (2001) emphasizes that the main targets are getting people in the organization informed and educating management and staff.

Gara (2001) recommends that a project team should be formed of HR staff members, IT professionals, and consultants who can communicate with each other well. A project manager who is an HR manager and has some technical knowledge is the most desirable person to lead this team. There should also be some staff members who will lead to the success of the project.

The HRIS's needs analysis is the first stage of the HRIS development and implementation for Gara (2001) and Walker (1982). The needs analysis is realized to ensure legal and government compliance, to meet increasing organizational needs, and use technology to reduce costs of the organization. Gaining the support of top management is important for this stage. Many researchers insist that if the needs assessment is not done accurately, the whole project will fail.

The Human Resource Information Center (HRIC) team functional duties during the implementation are the second important issue during an HRIS development and implementation. HRIC staff members are responsible for daily activities (preparing data for entry into system, editing data, troubleshooting errors, handling the requests for information) of the HRIS system and are recognized as experts in the system.

The third important issue is the costs related to an HRIS. "According to the results of a study (based upon responses from 181 firms, each with more than 1000 employees) on the Total Cost of Ownership (TCO) for payroll and HRIS functions, the average annual cost of ownership for an in-house HR system was 88 USD per employee" (Automatic Data Processing Incorporation, 2003). The study also revealed that companies may save an average 30% decrease in the TCO if they choose to outsource their HRISs.

Lastly, selecting a vendor is also considered as an important aspect during the HRIS development and implementation. Hosie (1995) suggests that a vendor must be financially stable and reliable in responding to problems after installation.

Human Resource Information System (HRIS). "A human resource information system is a systematic procedure for collecting, storing, maintaining data needed by an organization about its HR and personnel activities" (Jones and Hoell, 2005). The HRIS is used to support the planning, administration, decision-making, and control activities of HRM. Applications such as employee selection and placement, payroll, pension and benefits management, equity monitoring and productivity evaluation are supported by this information system. Organizations that use HRIS can keep their databases updated and accurate. Besides, it will reduce the amount of paper used and the time for information seeking, and automate the document flow (DeSanctis, 1986).

HRIS is used in HRM for different purposes. It supports all managerial activities, ranging from routine reporting to decision making (DeSanctis, 1986). Broderick and Boudreau (1992) think that organizations use HRIS to develop competitive products or services, but generally to improve HR decisions by providing accurate information. Kovach and Cathcart (1999) first mention an administrative purpose and for this purpose HRIS is applied to reduce time and costs. The second purpose of HRIS is to support decision-making

processes and is more related to HR planning. This gives managers of the different departments an opportunity to make decisions based on information from an HRIS (Kovach and Cathcart, 1999).

DeSanctis (1986) defines three levels of HRIS: operation/record keeping, managerial decision support, and planning. The applications at the lowest level support "internal and external reporting functions" and use data about "compensation, benefits, insurance programs, as well as employee records and position information" (DeSanctis 1986, 19). At the next level, decision-making activities concerning employee selection, placement and promotion, are supported by using employee background data, performance evaluations and skills inventories. And finally, planning applications support decisions concerning training projects, manpower planning, pension fund investments by using economic and industry data (DeSanctis, 1986).

Broderick and Boudreau (1992) also put the same three-level application system forward but calling the same phenomena differently: transaction processing/reporting/tracking applications, expert system applications, and decision support system applications. Transaction processing, reporting, tracking applications are used to support routine HR tasks such as "reviewing and documenting employee transfers, calculating employee pension benefits, and comparing current payroll levels against budget" (Broderick and Boudreau 1992, 11).

Some of these applications improve transaction processing. Others raise the accessibility of information available to decision makers by providing information from different sources, even outside the firm. These transaction processing applications support cost leadership objectives reducing administrative costs, increasing administrative standardization, accuracy, and auditing controls (Broderick and Boudreau, 1992).

Expert system applications improve decisions for which the appropriate results are determined through expert knowledge and experience. HR specialists use these applications to answer different HR questions such as "should the content of performance appraisal training differ for managers in different units?" or "where should we recommend our new division recruit to meet its hiring goals?" (Broderick and Boudreau 1992, 13). There are different outcomes for these decisions but experience and expertise within the firm will put forward certain alternatives.

Expert system applications allow firms to delegate many traditional HR responsibilities to working groups giving them opportunity to better understand how the organization's HR system functions and to be ready to suggest improvements "based on the team's understanding of customer demands" (Broderick and Boudreau 1992, 14). These systems also record and report employee choices, give recommendations optimizing employee demographic risk factors. Finally, expert systems assist line managers to make a decision in hiring, promotion, performance appraisal, career development, etc (Broderick and Boudreau, 1992).

Decision support system applications improve decisions for which there are not well-defined rules and the desired outcomes are uncertain. These applications put together different computer tools that give a user an opportunity to combine information, analyze it, and represent it in forms of graphs, reports, etc. For example, the HR department can design a statistical model to predict customer satisfaction from the narrow performance targets using a computer database from the firm's customer service group and a statistical analysis (Broderick and Boudreau, 1992).

Types of HRIS. Florkowski and Olivas-Lujan (2006) discuss eight types of HRIS that are transforming HR service-delivery in North America and Europe: HR functional applications, integrated HR suites, Interactive voice response (IVR) systems, HR intranets,

employee and manager self-service applications, HR extranets, and HR portals. They cluster these eight technologies in two groups – software targeting HR staff as end users and software targeting internal customers as end users. HR functional applications and integrated HR suite applications are included in the first group, and the other six applications are included in the second group.

HR functional applications offered software-enabled automation of discrete tasks and responsibilities necessary for the HR function. Though these technologies were used in order to make HR department's tasks easier and faster, there was no unifying standard for making cross-application interfaces more clear (Florkowski and Olivas-Lujan, 2006).

Integrated HR suite applications are described as "integral solutions for the HR departments" (Florkowski and Olivas-Lujan 2006, 686). Through these systems it becomes possible to access to larger databases through different modules that automate different HR sub-functions. Besides, they give an opportunity to share data easily across applications.

With the help of Interactive Voice Response (IVR) systems the phone calls are automatically directed to targeted recipients or recordings by pressing touchstone buttons. HR functions developed this technology to make easier telephone-driven consumption of such services as benefits enrollment, training registration, employee announcements, work-related surveys, etc (Florkowski and Olivas-Lujan, 2006).

HR intranet applications such as e-mail and electronic form software are used to diminish the costs of data entry for payroll, benefits administration, training administration etc. Employees become accountable for updating their databases and downloading forms necessary for competing task requirements. Through online employee handbooks and work-related documents employees can review company policies, access job postings, etc (Florkowski and Olivas-Lujan, 2006).

Self-service applications include employee self-service (ESS) applications and manager self-service (MSS) applications. These applications became technically available when static HTML applications were authorized to communicate with databases. As a result, there is no need for HR service-consumers to interact directly with HR service-providers for any kind of needs: to update their individual records, register for training, or record performance evaluations. These applications decreased the dependency on HR staff for the competent execution of every transaction falling within the function's content domain.

HR extranet applications serve as channels for electronic trade between client firms and HR vendors. "These are private computer networks that link the information systems of client firms to external vendors delivering HR services" (Florkowski and Olivas-Lujan 2006, 687). They give external vendors an opportunity to update personal information changes in databases and provide online oversight of health benefits, pensions, etc.

HR portal applications suggest a personalized, web-based access to all information systems that are needed to effectively consume HR services offered via the Internet. In some cases, employees can directly interact with external vendors satisfying their personal needs and interests (Florkowski and Olivas-Lujan, 2006).

Types of Organizations. According to Bernard (1938), an organization is a group of human beings constructed to seek certain goals (Vasu et al., 1998). Martin (1989) defines public organizations as grouping created by law, which form their budgets by taxes paid by the public. He states that public organizations are sometimes referred to as nonmarket organizations to distinguish them from those who get their benefit from market transactions (as quoted in Vasu et al. 1998). Public organizations are parts of government which in its turn is a part of political system. The role of the political system differs from the role of companies existing in the market economy. The primary goal of public organizations is equity and fairness in resource distribution. As for private organizations, Vasu et al. (1998)

note that the main goal of the private organization is to bring its profit to the top otherwise it will fail to survive in the market. However, this does not mean that the only goal of private organizations is to maximize their profit or that the only goal of public organizations is public service.

The comparison between public and private organizations has been the topic of research for many scholars. There are a number of articles about the differences and similarities of public and private organizations. Researchers have tested different propositions concerning public and private organizations based on a number of differences such as "environmental factors (e.g. higher degree of market exposure for private organizations), greater legal constraints and political influences for public organizations, organization-environment transactions (e.g. greater scrutiny of public organizations), and internal structures and processes (e.g. greater complexity of objectives and fewer incentives for performance in public organizations)" (Rocheleau & Wu 2002, 379). For example, public organizations are more apt to be involved in red tape, while private organizations are expected to take more risks (Bozeman & Kingsley, 1998 in Rocheleau & Wu, 2002). Some researchers find differences in workers in the two sectors concerning, for example, motivation, job satisfaction, and commitment (Buchanan, 1974 in Rocheleau & Wu, 2002). Recently they have found differences in workers' approaches to decision-making (Nutt, 1999 in Rocheleau & Wu, 2002).

Rainey and Bozeman (2000) compare public and private organizations and state that public organizations have greater goal complexity and ambiguity than business organizations. And the fact that public sector organizations have vague, hard-to-measure, multiple and conflicting goals is explained by the lack of sales and profit indicators and incentives for public agencies.

Anthony Downs (1967 in Vasu et al., 1998) relying on market principles, proposes a very important conceptualization of the differences between public and private organizations. He defines most public organizations as economically one-faced and most private organization as economically two-faced. The first face of private organizations is when they secure their scarce resources which they use to produce their outputs. The second face is the one they present to the market in which they try to sell their outputs for profit.

However, while discussing the issues of differences and similarities of public and private organizations one cannot ignore the role of human resources management (HRM) and HR departments. In any organization be it public or private, the HR department is the inseparable part of it.

Information Systems in Public and Private Organizations. Various researchers discussed the differences and similarities of public and private information systems. Despite the similarities between public and private organizations, there are some important differences that can distinguish government from private management IS. Bozeman and Bretschneider (1986 in Rocheleau & Wu, 2002) propose a framework for public management information systems (PMIS) arguing that there are underlying differences between public and private management information systems (IS). In particular, the public sector systems pay more attention to accountability, openness, and representativeness than private sector systems do. They state that a PMIS should be structured and controlled in different ways than does a private sector system. While private organizations often have to act quickly, PMIS errors can harm a larger number of people. Among the risky factors that can affect public organizations' activities are divided authority over IT decisions; many stakeholders with competing goals; 1-year budgets that hinder long-term planning; IT dependency on external agencies such as through budgets, legal requirements, etc. Therefore, Bozeman and Bretschneider (1986 in

Rocheleau & Wu, 2002) conclude that public systems should be developed more deliberately and tested more comprehensively.

Bretschneider and Wittmer (1993 in Rocheleau & Wu, 2002) found that public organizations used greater number of microcomputers per employee than had private sector organizations. They finally came to conclusion that the size of the public sector investments was most likely due to the information-intensive nature of government as well as to the use of microcomputers as compensation for personnel low salaries.

Aggarwal and Mirani (1999, in Rocheleau & Wu, 2002) studied how decision support system (DSS) models were applied in the public and private organizations. They found out that private sector DSS use was greater. They also concluded that in private agencies top managers were more likely to be the primary users of the system, whereas in public agencies middle managers were the users.

Elliot and Tevavichulada (1999, in Rocheleau & Wu, 2002) compared "computer literacy" in the public and private sectors. The research explored that government and private organizations were similar in their use of programs. And authors concluded that the "lack of differences" could be the result of the omnipresent nature of applications used for the same personnel purposes. They found that public agencies provided more computing training (95% versus 82%) but the frequency of "regular training" was higher in the private (40%) than in public (30%) organizations.

Though both types of organizations want to provide good services to their customers, it is more likely that private organizations will be willing to invest more resources in IT because of competition and because they consider IT to be crucial to their survival. Since 1980s, a theory has arisen that IS can be strategic assets to businesses and can allow them to gain competitive advantage. Moreover, the researcher's request to Amazon.com for basic information about the nature of their computer system was met with a refusal, stating that

"Amazon.com absolutely will not discuss the specifics of its Web computer architecture" (Morgan 1998, p.40 in Rocheleau & Wu, 2002).

In contrast, one of the specificities of public organizations is their willingness to share information about their computer systems. The borrowing of government computer systems is really quite often encouraged and even mandated. Public officials are often ready to share the most intimate details of the systems which they use.

Another important difference between the public and private organizations is their use of IS concerning their citizens or customers. Sometimes businesses such as banks use IT to decide whether they want certain customers depending on the amount of profit the bank makes off these customers. Public organizations cannot get rid of unprofitable citizens by using IT. This is a potentially important difference between the purposes for which the systems are used.

The complexity of the goals, accountability, openness, and equity issues can also differentiate public and private systems. Therefore, people engaged in designing public IS have to employ accountability and openness as main organizing principles for their systems. While private sector organizations need to use primarily to enhance their competitive positions in their market sectors.

The fact that IT can be a method to gain competitive advantage makes IT important to private sector organizations. That is why it is of utmost necessity for many private agencies to make investments in IT to improve services to clients. In contrast, competition is of less importance in the public sector, so public organizations will invest less amounts of money in IT. Nutt (1999) summarizes the public-private differences by stating that "competition for customers can be cumbersome or even prohibited for public organizations. Public organizations are often expected to collaborate with each other when offering similar services" (p. 312 in Rocheleau & Wu, 2002).

Bruce Rocheleau and Liangfu Wu (2002) discuss the differences of public and private information systems. They proposed the following hypotheses:

H1: private sector organizations perceive IS as more important to their success than do public organizations,

H2: private sector organizations invest more resources in IT than do public organizations,

H3: private sector organizations perceive training for IT as more important than do public organizations,

H4: private sector organizations invest more resources in training for IT than do public organizations.

For measuring the importance of IT they asked IT managers to evaluate the importance of the IS to the decision-making process of their organizations (on a scale 1 to 5) and to assess the degree to which the organization is dependent on the computer system (on a scale 0 to 100). They measured the amount of resources spent on IT overall by the total amount of spending reported for there is per full time equivalent (FTE) and by the numbers of IS professionals employed per FTE, in effect controlling for the size of the organizations.

The researchers measured the perceived importance of end-user training by responses from the IS manager and the amount of resources devoted to training. They also asked a question to find out what different types of trainings the organizations provided.

As a result of research Rocheleau and Wu found out that the average number of IS professionals in private sector organizations exceeded that of public sector agencies. When comparing the amounts spent on IT training it turned out that the amount spent by the private sector was more than twice that of the public sector. They also discovered that the total number of different types of training methods did not differ significantly.

To summarize, Hypotheses 1 and 3 were not confirmed. The research explored that IS managers perceived their IT resources and training to be just as important as did managers in the private sector. By way of contrast, Hypotheses 2 and 4 were confirmed – private sector organizations invest more resources in both IS in general and training in particular.

It is obvious that both public and private sector managers believe that IS training is important, but both, especially public organizations, fail to invest many absolute resources in it. Governments clearly view the Internet and technology as key mechanisms for saving on personnel costs, and they make substantial investments for this reason rather than for competition.

We hypothesize for the above-mentioned trends also to hold in Armenia,so based on the previous research, our aim is to explore whether there are differences in the level of automation of HR activities in public and private organizations of Armenia and also to find out different types of impacts that IT has on HRM.

The hypotheses proposed in this study are the following:

Hypothesis #1: The level of automation of HR activities is higher in private organizations than it is in public organizations of Armenia.

Hypothesis #2: The level of automation of HR activities in Armenian organizations is correlated with the transformational impact of IT in the organizations.

RESEARCH DESIGN

To test the above mentioned hypotheses comparative case study is employed. We chose four organizations of Armenia: two public and two private. One of the public organizations was domestic (Ministry of Economy), another was foreign (US Embassy). The same logic was used while selecting private organizations – one domestic (Armeconom Bank) and one foreign (SEF International Universal Credit Organization). The two private

organizations were from the same industry. We conducted face-to-face interviews and interviewed twelve people: six respondents from the public sector, and six – from private sector. In each organization three people were interviewed: an employee, a line manager, and an HR manager. A cross-sectional analysis was conducted. In order to minimize bias we developed anonymous self-administered questionnaires. To measure automation and impact levels new measures have been developed. The respondents were given an open-ended question to define what has been changed after the organizations introduced new information technologies.

The following research questions were proposed:

1. In what type of organization is the highest level of automation?
2. In what type of organization is the lowest level of automation?
3. In what type of organization is the operational impact highest?
4. In what type of organization is the operational impact lowest?
5. In what type of organization is the relational impact highest?
6. In what type of organization is the relational impact lowest?
7. In what type of organization is the transformational impact highest?
8. In what type of organization is the transformational impact lowest?
9. Is there a correlation between high operational and high transformational score?

DEFINITION OF VARIABLES

The main variables in the study are the type of the organization (public/private) and impact level.

Variable #1. 'Payroll' is the sum of all financial records of salaries, wages, bonuses and deductions. This variable will show whether the payroll activities are automated in the discussed organization or not. There is one question measuring this variable.

Variable #2. 'Demographic data' are the characteristics of employees such as gender, age, marital status, disabilities, education, position, etc. Through this variable we will find out whether it is possible to identify the most demanded positions and occupations to be fulfilled by inputting demographic data. There is one closed-ended question measuring this variable.

Variable #3. 'Job evaluation' is the process of determining a relative internal value of a job in an organization in order to establish fair and equitable salary and wage system. This variable will show how the HR specialists conduct the procedures of job evaluation and position classification in the organization. The variable is measured by one closed-ended question.

Variable #4. 'Selection' is a process of employee hiring. This variable will show whether the selection process is automated in the organization or not. There is one closed-ended question measuring this variable.

Variable #5. 'Appraisal' is a method by which the job performance of an employee is evaluated. This variable will show how the appraisal is done in the organization. There is one closed-ended question measuring this variable.

Variable #6. 'Development and training' are the activities concerned with organizational activity aimed at improving the performance of employees. Through this variable we will find out the principle of organizing employee development and training activities. There is one closed-ended question measuring this variable.

FINDINGS

Measuring the Level of Automation of HR Activities

Table 1

Organization / Automation	Public		Private	
	US Embassy	Ministry of Economy	SEF International	Armeconom Bank
Payroll	+	+	+	+
Demographic	+	+	-	+
Job evaluation	+	-	-	-
Selection	-	-	-	-
Appraisal and rewards	+	-	-	-
Training and development	+	-	-	-
Total	5/6	2/6	1/6	2/6

In the first column of **Table 1** HR activities are mentioned: payroll, demographic, job evaluation, selection, appraisal and rewards, training and development. The organizations are grouped as public and private. With '+' we mark the activities that are automated in the organizations, with '-' are marked the activities which are not automated.

In the row 'Total' we can see that from 6 HR activities most (5 from 6) are automated in US Embassy (foreign public). Only selection process is not automated in US Embassy. In domestic private and public organizations (Armeconom Bank and The Ministry of Economy) only 2 HR activities from 6 are automated, and interestingly, these are the same 2 functions: payroll and demographics. And in SEF International UCO (foreign private) only payroll is automated.

If we try to appraise the level of automation of HR activities in the four organizations under the study from the scale 1 to 4 where 1 is very low and 4 is very high, the following results can be drawn out (See **Table 2**):

Table 2

Type of the organizations	Public		Private	
	Foreign	**Domestic**	**Foreign**	**Domestic**
Organizations	US Embassy	Ministry of Economy	SEF International	Armeconom Bank
Level of automation of HR activities (in the scale 1-4, where 1-very low, 2-low, 3-high, 4-very high)	3.3	1.3	0.6	1.3
Level of automation of HR activities (%)	83.3%	33.3%	16.6%	33.3%

From these results we can see that the highest level of automation of HR activities is in foreign public organization, i.e. in the US Embassy – 3.3 or 83.3%. In domestic private (Armeconom Bank) and domestic public (The Ministry of Economy) organizations the level is the same - 1.3 or 33.3%. And the lowest level of automation of HR activities is in foreign private organization, i.e. in SEF International UCO – 0.6 or 16.6%.

Assessing the Impact of IT on HR Activities

Based on the article Snell et. al. (2001) we measured operational, relational and transformational impacts of IT on HR. Questions 1-6 (see **APPENDIX**, *Questionnaire*) were asked to measure the *operational* impact. And the results can be seen in the second row of **Table 3**.

In fact, we calculated the scores of operational impact in the same way as the level of automation of HR activities in the organizations. From the Table 3 one can see that the

operational impact of IT on HR activities in the US Embassy is the deepest. And its score is 3.3. In the Ministry of Economy and in Ameconom Bank the operational impact is in the same level which is 1.3. And finally the operational impact of IT on HR activities in SEF International UCO is 0.6 and we can say that operational impact is nearly absent.

Table 3

Impacts	US Embassy	Ministry of Economy	SEF International	Armeconom Bank
Operational	3.3	1.3	0.6	1.3
Relational	6	5	5	4
Transformational	3	1.5	1	1

Relational and *transformational* impacts were calculated based on the question 7 which is a matrix question and is consisted of seven statements. We used first four statements for measuring the *relational* impact of IT on HR activities. Each of these four statements we gave a variable (See **Table 4**) – a, b, c, d. And based on the importance of the statements we gave them different coefficients. In defining the relational impact more importance was given to the fourth statement which explores whether the employees of the organizations have an access to the system to change something in their personal information (marital status, address, etc.) or not. So, the coefficient 2 was given to the fourth statement. The interesting finding here was that in all of the organizations this statement was answered negatively, which means that in none of them employees were allowed to change their personal information in the system. They should ask an HR manager about it. We can conclude from this that information technologies are not so widely used in Armenian organizations and that HR managers still do not trust the system completely. The formula for the calculation of the relational impact is the following:

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Relational Impact = a+b+c+2d

The answers to the matrix question were also given different values. Responses with 'Strongly agree' were counted as 2 points, 'Agree' – 1 point, 'Disagree', 'Strongly disagree' and 'Don't know' – 0 point. The results are in the third row of **Table 3.** We see from those results that the relational impacts in four organizations are not so differ from each other as it was in case of operational impact. From these results we can conclude that despite in most of the organizations observed the level of automation of HR activities is low and correspondingly the operational impact of IT on HR is weak, the relational impact is almost the same in all four organizations. This means that as a whole the IT eliminate redundancies, save resources such as manpower, time, money, paper, etc., make communication faster and processing of necessary information better. We should mention here that the respondents were given an open-ended question (Question 8) asking them to define what has been changed (in terms of functions) after the organization introduced new IT. And nearly all the answers were the same: less paperwork, more software instead of the old paper based work, easy access to certain files, many procedures became smoother, more trustful data, reduced probability of errors, etc.

Statements 5-7 in the matrix question (See **APPENDIX,** *Questionnaire*, question 7) were used for calculation of *transformational* impact. We applied the same approach while calculating the transformational impact as it was in case of relational. Each of these three statements we gave a variable (See **Table 4**) – e, f, g. And based on the importance of the statements we gave them different coefficients. In defining the transformational impact more importance was given to the fifth statement which was about using web-based e-learning methods such as online trainings. And less importance is given to the seventh statement which is about getting automatic feedback. So, the coefficient 2 was given to the fifth statement, and the coefficient 0.5 – seventh statement.

The formula for the calculation of the transformational impact is the following:

Transformational Impact = 2e+f+0.5g

The values of the answers were the same as there were in case of relational impact: 'Strongly agree' were counted as 2 points, 'Agree' – 1 point, 'Disagree', 'Strongly disagree' and 'Don't know' – 0 point (See **Table 4**). The results are in the fourth row of **Table 3.** We can see that, again, the US Embassy showed the highest results – 3. In the other three organizations the transformational impact is nearly the same: 1.5 in the Ministry of Economy, and 1 in SEF International UCO and in Armeconom Bank. From the four organizations under the study only in the US Embassy the employees are using web-based e-learning methods (i.e. online trainings) and get information from relevant sources. Though in Armeconom Bank these methods of employee development are not applied, they use internal networks for "distance learning". This method gives the employees from marzes an opportunity to consult with the specialists who are in Yerevan. As the organization has 18 branches located in different towns and cities of Armenia and Nagorno Karabakh, the idea of distance learning is more cost efficient than to organize a training in Yerevan. In the Ministry of Economy employees get information from relevant sources and this is the reason that the transformational impact of IT in the Ministry is a bit higher (1.5) than in SEF International UCO and in Armeconom Bank (1).

Variable	Statement
a	In your organization new system eliminates some things, such as paper-work
b	After inputting new system communication has become faster in your organization
c	After inputting new system processing of all necessary information has become better

d	In your organization employees have an opportunity to change something in their personal information in the system
e	In your organization you use web-based e-learning methods, i.e. online trainings
f	You get information from relevant sources in your organization
g	In your organization you get automatic feedback on certain activities

Table 4

While comparing the results of **Table 2** and **Table 3** we can see that transformational impact of IT on HR activities is the highest in the organization where the level of automation of HR activities is the highest, i.e. in US Embassy. And in SEF International UCO where the level of automation of HR activities is the lowest, transformational impact is also the lowest.

During the study we observed the sizes of the organizations under the study and wanted to explore whether there is a correlation between the transformational impact of an organization and the size of the organization. In the **Table 5** one can see the number of employees in the organizations with the contrast of the level of automation of HR activities and with the results of operational, relational and transformational impacts. It should be noted here that in spite of the fact that the number of employees working in the US Embassy is counted as 300, those are the employees working in US Embassy of Armenia. But there are 296 US Embassies and Consulates all over the world and their employees are also considered as people working in the US Embassies, within the wider system of the Department of State. The idea is that the US Department of State regulates the whole system, and the size of the US Embassy is larger than it is seen in the **Table 5.** In case of SEF International UCO the same approach is applied. There are many branches of SEF International in the world and we cannot define the exact number of employees. So, the US Embassy is considered as the largest organization under the study.

We tried to explore whether there is a correlation between the size of the organizations and the transformational score. And we find out that the size of the organization matters: in larger organizations the score of transformational impact is higher. US Embassy is the largest organization under the study and the transformational impact is the highest there.

Table 5

Type of the organization	Public		Private	
Organization	US Embassy	Ministry of Economy	SEF International	Armeconom Bank
Size of the organization	300 (in Armenia)	266	80 (in Armenia)	714
Level of automation	83.3%	33.3%	16.6%	33.3%
Operational	3.3	1.3	0.6	1.3
Relational	6	5	5	4
Transformational	3	1.5	1	1

We compared domestic public (Ministry of Economy) and domestic private (Armeconom Bank) organizations. The results drawn in the **Table 5** prove that the level of automation of HR activities in public organizations is higher than in private organizations. In case of domestic public and domestic private organizations we see that in spite of the fact that they differ in size - domestic private (Armeconom Bank) is larger than domestic public organization (Ministry of Economy) (266 vs. 714), the level of automation is the same in both domestic organizations (33.3%).

CONCLUSION & RECOMMENDATIONS

From all the findings analyzed above we can induce that the *level of automation* of HR activities is higher in public organizations of Armenia than in private organizations. So, our first hypothesis that the level of automation of HR activities is higher in private organizations than it is in public organizations of Armenia is not proved. During the study we also found out that there are different levels of automation of HR activities in domestic public and foreign public organizations. In the latter the level of automation was higher (83.3%) than in the former (33.3%).

Our study has revealed that the *transformational* impact of HR activities is higher in the organizations where the level of automation of HR activities is higher. The findings show that the highest score of transformational impact is in US Embassy (3) where the highest level of automation was recorded. And correspondingly, the lowest transformational score is in SEF International UCO (1) where the level of automation is the lowest (16.6%). These results proved our second hypothesis that the level of automation of HR activities in Armenian organizations is correlated with the transformational impact of IT in the organizations.

We also discovered that there is a correlation between the scores of *operational* and *transformational* impacts. The higher the score of operational impact, the higher the score of transformational impact. In the US Embassy where the operational impact is the highest (3.3) the transformational impact is also the highest (3). In SEF International UCO the scores of operational and transformational impacts are the lowest (0.6 and 1 respectively).

From the results we can conclude that despite in most of the organizations observed the level of automation of HR activities is low and correspondingly the operational impact of IT on HR is weak, the *relational impact* is almost the same in all four organizations. This means that as a whole IT eliminates redundancies, save resources such as manpower, time,

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money, paper, etc., make communication faster and processing of necessary information better.

During the study we also found that the size of the organization matters. Organization with the greatest number of employees (US Embassy) has the highest level of automation and the highest score of transformational impact.

Still, there were certain limitations which can be improved in further studies. As we have already mentioned the study was exploratory in design and did not have tests of confirmatory power. We tried to find out whether there are differences in the level of automation of HR activities in public and private organizations of Armenia and also to find out different types of impacts that IT has on HRM. However, the sample size was little and for more generalizable conclusions larger sample is needed.

The results of the study may be misleading since the size of the organization matters, so many improvements happen due to economy of scale. Measures and instruments of the study can also be improved.

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APPENDIX   *Questionnaire*

Interview date: _____

Organization: _____

Hello. My name is Gohar. I am doing a research about the role of information technologies in Armenian organizations. Your answers to our questions would be very helpful for us to learn about how the information technologies influence HR activities of the organization. The interview should take about 5 minutes. All your responses are very important. Please know that we will guarantee the anonymity of the answers you provide. In fact, we will not be able to connect your answers with your name. *(Show the questionnaire to the respondent.)* May I begin? Thank you.

1. Are payroll activities automated in your organization?

_____ Yes (please explain how) _____

_____

_____ No

2. In your organization inputting demographic data (by positions and occupations) allows to:

_____ Identify the trends by positions and occupations

_____ Identify the most demanded positions and occupations to be fulfilled

_____ other (please specify) _____

3. How are procedures for job evaluation and position classification conducted in your

organization?

_____ By comparison

_____ Measuring against some scale

_____ By distribution of the jobs against the assessments into grades

_____ other (please specify) _____

4. How is the selection process conducted in your organization?

_____ manually

_____ computerized

_____ semi-manual, semi-computerized

5. In your organization appraisal and rewards are done through:

_____ rating the employee based on pre-agreed criteria

_____ matching at least some part of pay with performance

_____ other (non-pecuniary) rewards tied to performance

6. In your organization while conducting employee development and trainings what do you pay attention to:

_____ matching training with needs identified through job descriptions

_____ matching training with needs identified through appraisals

_____ comparing the effectiveness of different training modules, events, etc.

_____other (please specify) _____

7. Now I am going to read you some statements. Using your own personal opinion, please tell me if you strongly agree, agree, disagree, or strongly disagree.

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know Can't say
In your organization new system eliminates some things, such as paper work					
After inputting new system communication has become faster in your organization					
After inputting new system processing of all necessary information has become better					
In your organization employees have an opportunity to change something in their personal information					
In your organization you use web-based e-learning methods, i.e. online trainings					
You get information from relevant sources in your organization					
In your organization you get automatic feedback on certain activities					

8. In terms of functions, what has been changed after the organization introduced new IT?

_____

_____

_____

9. Circle gender

___ Male   ___ Female

10. How old are you? _____

11. Your position

____ Managerial   ____ Non-managerial

12. Type of the organization

____ Private

____ Public

____ Foreign

____ Domestic

Thank you for your time and patience.