Exploring the Role of Employee Age in Improving ICT Adoption Projects: Lessons Learned from Enterprise System Practitioners

Full paper

Ewa Soja
Cracow University of Economics
ewa.soja@uek.krakow.pl

Piotr Soja
Cracow University of Economics
eisoja@cyf-kr.edu.pl

Abstract

This study aims to investigate the role of employees' age in improving ICT adoption projects. In doing so, the current study draws from the opinions of enterprise systems (ES) practitioners collected during an exploratory research in Poland. The discovered recommendations for improving ES adoptions have been categorized into a two-level taxonomy and then analyzed from the respondent age perspective. The main findings suggest that the strong points of older workers involve their people-oriented approach to various issues connected with system, training, provider, and project preparation. However, on the other hand, the elderly need training on modern management techniques and ICT, which would reduce differences in their perception of the implementation process- and system-related areas as compared to younger workers. The awareness of strong and weak points of the elderly in the context of their experience with ES and eliminating shortcomings should contribute to their greater digital inclusion.

Keywords

Ageing, the elderly, ICT, digital inclusion, enterprise systems, Poland.

Introduction

Information and communication technology (ICT) is undoubtedly a critical component of the contemporary world, offering a wide range of potential benefits for organizations and individuals. The most advanced ICT solutions include enterprise systems (ES), which are designed to support the management and integration of the whole company and offer inter-organizational integration with company's clients and suppliers (Volkoff et al. 2005). ES adoption is a usually lengthy process which is risky and is experiencing various problems and obstacles (Kim et al. 2005), which indicates a need to conduct investigations into the improvement of such endeavors. As ES adoptions involve various stakeholders from the whole organization (Soh et al. 2011) and their complexity stems from significant technological and people-related considerations, improvements of such projects should be performed in various areas. This is connected with different skills and competences required from employees, whose work ability may depend on age (Imarinen 2001).

In general, older members of society are less likely to benefit from ICT due to, among other things, negative attitudes toward computers and technology anxiety growing with age (Wagner et al. 2010). At the same time, demographic projections suggest that the ageing and shrinking of labor force will affect the whole economy. Therefore, an adjustment to new conditions will be the significant challenge for all participants involved in economic processes (e.g. Boersch-Supan 2003). Employers and employees often perceive ageing as contributing to increased managerial and interpersonal skills, creative problem solving capacities, and employee morale. However, on the other hand, age contributes to reduced learning capacities or to more resistance and less willingness to change (e.g. Conen et al. 2011, Soja and Stonawski 2012).

Overall, prior research indicates that ICT-related benefits are not enjoyed equally by all members of society – the idea which is known as the digital divide (Hill et al. 2008). Since older members of society appear to be more afflicted by the digital divide, we believe that it is worthy to investigate their needs and perceptions of the ICT adoption projects. Therefore, we aimed to investigate the role of employee age in ES adoptions improvement and the specific research question which guided our study was:

- How does the perception of the areas for improvement in ES adoptions vary depending on employee age?

The paper is organized as follows. In the next section we present research background focusing on implications of ageing and describing main impediments and problems faced by ES adoptions. Next, we describe our research method, which is followed by the presentation of results. We then discuss our findings, explain implications, and close the study with concluding remarks.

Research Background

The contemporary demographic changes in developed countries result in deepening of the process of population ageing. Such phenomena as decrease in fertility and fertility values remaining below the level of simple replacement lead to the decreasing number of people in younger age groups. At the same time, there are gains in life expectancy related to decrease in mortality. Such situation leads to an increase in the share of older people in the whole population (e.g. Basten et al. 2013, Soja 2011, 2013). According to demographic projections, the percentage of people at age 65 and above in Europe will increase from 17.6% in 2015 to 26.7% in 2045 and respectively in Poland from 15.5% to 28.1% (United Nations, 2015, medium scenario). At the same time, number of people aged 0-19 years will decrease during this period by 12 256 thousands in Europe (decrease by 1 percentage point), and by 2 182 thousands in Poland (decrease by 3.8 percentage points).

Demographic projections also suggest the shrinking of population in age 20–64 years. This group is of special importance as it defines the potential labor force. According to U.N. projections (2015, medium scenario) the percentage of potential working age population (20–64) in Europe will decrease from about 61.6% in 2015 to 53.5% in 2045 (decline by 60 784 thousands) and respectively in Poland from 64.4% to 55.6% (decline by 3 637 thousands). At the same time, the population in age 20–64 years will gradually age. Median age in this group will rise from 42.8 in 2015 to 43.3 years in 2045 in Europe and respectively in Poland from 41.8 to 46.4 years.

Employers' fear or reluctance to employ older people or encourage them to extend their professional activity are to a large extent caused by the way how older workers are perceived by the employers (van Dalen et al. 2010). Research indicates that the majority of employers associate ageing employees with a higher knowledge base, experience, loyalty to the organization, reliability, and interpersonal skills but also with greater costs related with salaries, lower productivity levels, and lower ability to use new technologies and adjust to organizational changes (e.g. Conen et al. 2011, Soja and Stonawski 2012). Also, as emphasized in an OECD report, problems with professional activity of older people, such as early exit from the labor market and difficulties with employing older people, are connected with negative stereotypes about the abilities and productivity of older workers as compared with younger employees (van Dalen et al. 2010, OECD 2006).

Older people have to adapt to the rapid changes in the contemporary world and the widespread use of ICT. This refers to both private and professional spheres of people's life. In the professional context, the elderly have to deal with technology and ICT systems being implemented and operating in the company. As previously indicated, enterprise systems (ES) are one of the most advanced ICT systems widely used by companies. ES, having their roots in MRP, MRP II, and ERP systems, are now very complex systems that support the management and integration of the whole company and offer inter-organizational integration with company's clients and suppliers (Volkoff et al. 2005). In consequence, the process of ES implementation in a company is very complex, risky, and connected with various problems and barriers. In particular, the problems in ES adoption and use, most often reported in prior studies, include lack of users' involvement, difficulties with business process redesign, system drawbacks, time over-run, and lack of end user acceptance (e.g. Kim et al. 2005).

The most important barriers faced by ES practitioners during ES adoption and use, in turn, involve system drawbacks, inadequate knowledge of project participants, inadequate provider support, high adoption cost, people's resistance to the new system and changes, and poor company's organization (e.g. Kamhawi 2008, Kumar et al. 2002, Saatcioglu 2009, Themistocleous and Irani 2001).

As illustrated above, problems and barriers faced by ES practitioners include various issues connected with involved people, implementation process, and technology being adopted. Such a variety of impediments experienced by ES adoption projects suggests a vital need to improve the process of ES deployment. There is a need to look for advice and recommendations how to overcome the problems and barriers in particular, and how to improve the ES implementation projects in general. In doing so it seems necessary to take into consideration employee age as (1) many ES adoption considerations are people-related, (2) due to ageing labor force older employees are more and more significant employee group in companies, and (3) prior studies on ES adoption considerations seem to lack an age-related analyzes.

Although some prior research studies investigated ES adoptions from the perspective of various stakeholders (e.g. Soja 2015, Kamhawi 2008), to the best of our knowledge in ES research a gap still exists, connected with lack of an in-depth examination of employees' age and demographic background. Such an investigation is, in our opinion, interesting and worth studying in light of global demographic changes.

Research Method

In order to answer the involved research question the current study employs a qualitative research approach based on grounded theory (Charmaz 2006, Corbin and Strauss 1990). In particular, we turned to practitioners to learn what their opinions are as regards improvements of enterprise system adoption projects. In consequence, the current study is based on data gathered from practitioners dealing with ES implementation or involved in an ES package operation in various companies in Poland. In total, 185 practitioners expressed their recommendations regarding the improvement of enterprise system projects. The inquired respondents were diverse as regards their organizational position and roles played during the implementation process; they represented both main parties involved in ES adoptions: adopter and provider. During the process of data gathering, the respondents were asked to perform a retrospective assessment of their ES adoption projects and to identify areas which, in their opinion, called for improvement.

In consequence of the data gathering process, respondent opinions expressed in natural language have been collected. Then we performed the process of open coding (Corbin and Strauss 1990), where the respondent statements were compared and analyzed in the search of similarities and differences. The statements were given conceptual labels and categories and subcategories were created. Next, the process of axial coding was performed, during which the relationships between categories and subcategories which emerged during the process of open coding were tested against data and verified. As a result, the categorization of the reported recommendations was worked out and agreed upon by the authors.

In general, we adopted a two-step approach to the data analysis. During the first step, described above, the categorization of recommendations was performed on the basis of the opinions of all respondents regardless of their age. During the second step, the discovered categories and elements were analyzed taking into consideration respondent age group. In consequence, the distribution of recommendations and recommendation categories across different respondent age groups was elaborated. This allowed us to explore the role of employee age in perceiving recommendations as regards improvement of ES adoptions. Such a two-step approach allowed us to obtain a robust categorization of recommendations and to ensure comparability of recommendations across the age groups.

To investigate the impact of age on the perception of recommendations we divided respondents into groups on the basis of their age. In doing so, we drew from prior demographic studies and their definitions of older employees. Despite the fact that prior studies suggest several definitions of older employees (Stonawski 2007), it seems that the age of 50 years is the most commonly used starting age for the definition of older employees. In particular, such a limit was most often defined by Polish employers and human resources managers (Soja and Stonawski 2012) and was adopted in the study by Conen et al. (2011). Consequently, in the current study we defined the following age groups: Age1 – less than 35 years

(Younger), Age2 – between 35 and 49 years (Middle-aged), and Age3 – 50+ years (Older). The numbers of respondents in each group are presented in Table 1.

Age Group	n
Age1 (Younger, less than 35 years)	102
Age2 (Middle-aged, between 35 and 49 years)	59
Age3 (Older, 50+ years)	24

Table 1. Respondents by Age Group

Data Analysis and Results

Recommendations for Improvement in Respondent Answers

On the basis of empirical data analysis five main categories of recommendations were extracted. They include recommendations connected with various aspects related to implementation project preparation (category "1. Project preparation"), advice related to the implementation process run (category "2. Implementation process"), recommendations connected with the enterprise system implemented (category "3. System"), suggestions related to the improvement of trainings (category "4. Training"), and propositions connected with the implementation services provider (category "5. Provider"). The recommendation categories and individual recommendations indicated by the respondents are described in the following subsections.

Project preparation

The recommendations connected with the project preparation refer first and foremost to activities connected with company analysis prior to the implementation project start and project schedule definition. The suggested activities include a more detailed analysis and company needs definition. These activities should involve various stakeholders such as company's employees, system users, and department managers. More attention should be paid to the preparation of the project schedule and to the planned project time, which often requires extension. Other suggestions for improvement include better preparation of the company employees for the project and evaluation of their readiness and attitudes towards changes imposed by the implementation project. Also, adequate employees' IT skills needed during the project should be secured.

In general, the implementation project should be well prepared and the company's organizational structure and its processes should be modified taking into account the new system's requirements. In particular, responsibilities in the project should be allocated to concrete people. Company's finances should be particularly taken into consideration and the total costs connected with the implemented system and its expansion should be considered (i.e. hardware, new system cost). It is beneficial to define tangible project goals in the project plan.

Implementation process

The recommendations connected with the implementation process run refer first and foremost to communication during the project, project team composition, and controlling implementation costs. In particular, the respondents advise that the company's employees should be informed of the adoption project and its consequences and benefits. Good communication should start during the early stages of the project and should involve employees from various department of the company, including IT department. The respondents recommend paying more attention to the project team composition and ensuring that the selected people should represent all company's business areas affected by the adoption project. Special attention should be paid to the adoption project costs and their greater control. In doing so, it is advisable to take into consideration the total project costs.

Other pieces of advice include a competent and empowered person holding the position of the project manager, motivation system rewarding the employees' involvement in the implementation duties, and ensuring appropriate time for system testing. The respondents also point out to good project management, immediate problem solving during the project, and timeliness of the project tasks. The

respondents also emphasize the role of top management support and involvement of the project team during the implementation project run.

System

The system-related recommendations are mainly connected with fit between the system and company needs, infrastructure, and the process of system choice. In particular, it is advised that system should satisfy the company needs and requirements and its fit to the actual company organization should be considered. An appropriate IT infrastructure satisfying the new systems requirements should be ensured. The company should pay more attention and devote more time to the process of the system choice. In doing so, it is advisable to perform an in-depth evaluation of the new system and to take into account system solutions used by companies from the same industry.

Other recommendations refer to a number of characteristics connected with system quality. In particular, special attention should be paid to the system functionality, interface, possibility of extension, and integrity. It is also advised to take into consideration the condition of the company's legacy systems and their compatibility with the new enterprise system.

Training

The trainings-related recommendations in general focus on the training quality and participants. The company should ensure the proper training of its employees and their preparation for the new enterprise system use. More attention should be paid to the choice of the trainings' participants. It is advised to devote more time to trainings and pay more attention to their timing (in many cases the trainings should be organized earlier). It is also recommended to pay more attention to the trainings quality and the level of trainers' preparation for the trainings. Some respondents advise paying more attention to the trainings scope and organize more complex trainings.

Provider

The provider-related suggestions revolve around cooperation with the implementation services provider and quality of their services. In particular, the respondents advise to put more emphasis on better cooperation with the provider and pay more attention to their competences. It is advised to take care of the consultant selection and their preparation for the consulting sessions. Finally, the respondents emphasize the crucial role of the agreement between the companies and advise to pay more attention to the preparation of such a document.

Discussion of Findings

The proposed areas of improvement in the five recognized categories, when analyzed at a category level, depend to a large extent on respondent age (see Table 2). The recommendations connected with project preparation were emphasized to a largest extent by the youngest and the oldest respondents. The possibility of improving the implementation process was highlighted to the largest extent by the respondents from the middle group, then by the youngest, and next by the oldest respondents. The emphasis put on the recommendations connected with the system improvement tended to decrease with age, while in the case of trainings, their perception increased with respondent age. Regardless of respondent age, recommendations related to the provider were not perceived as an important source of project improvement.

Younger	Middle-aged	Older
1. Project preparation	1. Project preparation	1. Project preparation
3. System	2. Implementation process	4. Training
2. Implementation process	3. System	2. Implementation process
4. Training	4. Training	3. System
5. Provider	5. Provider	5. Provider

Table 2. The most important improvement categories by respondent age

The results of data analysis from the employee age perspective are presented in Table 3. The table displays the distribution of reported recommendations across the three age groups. The bullets in the table were defined on the basis of the percentage of responses provided by the respondents from an individual age group declaring a given recommendation.

Taking into consideration individual subcategories of recommendations related to the project preparation, we may notice that younger respondents pay special attention to the company analysis and needs definition, as well as to implementation time and employee preparation for changes. The middle-aged respondents pay similar attention to a detailed analysis and needs definition, however, they definitely emphasize to a greater extent the work time assured for the implementation tasks, which is noticeable in the recommendation connected with the schedule. Additionally, they indicate BPR-related improvement to a larger extent than younger respondents. Overall, we can conclude that younger respondents reveal a more organizational and formal approach to an implementation project as they point out such issues as analysis, cost evaluation, and goal definition. They seem to perceive the project through the project management mechanisms. Older respondents, in turn, in their perception of the implementation project, seem to use their practical experience connected with company knowledge.

The oldest respondents, as compared to other employees, place slightly lesser emphasis on recommendations connected with a detailed analysis and schedule. They also seem to use their professional knowledge by indicating the necessity to perform BPR. However, it appears that the formal project management-related approach is employed by them in a more routine way as compared to the younger respondents. In turn, the oldest respondents emphasize to a largest extent people-related issues connected with project preparation (e.g. employee preparation, IT skills, responsibility allocation). Such an attitude might stem from their experience and possessed knowledge, but also from greater interpersonal skills and attitudes towards the company (e.g. loyalty to employer, responsibility) (e.g. Ilmarinen 2001).

The oldest respondents perceive to a limited extent the need for improvement within the category Implementation Process. Such an attitude might be explained by their limited skills and knowledge in the area of project management and lack of project-oriented thinking, which may be connected with routine and their obsolete knowledge. Older employees perceive only the most important considerations connected with people (communication, project team composition) and the need for cost control. However, it should be stressed that the latter is a universal recommendation formulated regardless of respondent age.

The middle-aged employees are oriented towards improvement connected with the implementation process. It appears that due to their accumulated experience and more up-to-date knowledge of IT and management techniques, the middle-aged employees are more often involved in and responsible for the implementation project. This might be concluded, for instance, from their emphasis placed on the importance of the project team and project manager.

At the same time, the middle-aged respondents uniquely point to the importance of motivational system. From one hand, this might stem from underestimation of their work by employers and expressed by relatively low salaries in relation to productivity in this age group (e.g. Skirbekk 2008). On the other hand, such an opinion might reveal their long-term thinking which comes with age and experience in project management. The youngest respondents seem to concentrate on current, short-term issues such as immediate problem solving and timeliness. Older employees, in turn, seem to have a broader perception of underlying mechanisms and ensuing consequences (e.g. motivational system, role of the project manager in managing the implementation).

Recommendations connected with system improvement are proposed first and foremost by the youngest and middle-aged respondents. This might stem from greater IT competences possessed by younger people (e.g. Soja and Stonawski 2012). Younger respondents perceive the possibility of system improvement with respect to system quality, which is possible due to their deeper knowledge of the IT field. They point to many significant elements which are not perceived by older respondents, such as functionality, interface, fit to legacy systems, and integrity. Older people also perceive the possibility of improving the system; however, their recommendations are more general and do not involve professional knowledge (e.g. infrastructure, fit to company needs).

Improvement category \ Age group	Younger	Middle-aged	Older
1. Project preparation			
detailed analysis	●	●	◑
need definition	●	◕	◕
schedule	◔	◕	◑
time	◕	◑	◑
employee preparation	◑	◑	◑
BPR	◔	◑	◑
IT skills	◔		◕
better preparation	◔	◔	◑
responsibility allocation	◔		◑
finances	◔		◑
cost estimation	◔		
goal definition	◔		
2. Implementation process			
communication	◑	◕	◕
team composition	◑	◕	◑
cost control	◑	◔	◑
project manager		◑	
motivation system		◑	
testing	◔	◑	
problem solving	◑		
project management	◔	◔	
top management support	◔	◔	
team involvement	◔	◔	
timeliness	◔		
3. System			
fit to company needs	◕	◑	◑
infrastructure	◑	◑	◑
choice	◑	◑	
flexibility	◑	◔	◑
functionality	◔	◔	
interface	◔	◔	
fit to legacy systems	◔	◔	
integrity	◔		
4. Training			
employees	◑	◑	●
time	◑		●
quality	◔	◑	◑
more training	◔	◑	◑
earlier training	◔	◔	◑
scope	◔	◑	
5. Provider			
consultants			◕
cooperation	◔	◑	
competence	◑	◔	
agreement	◔		

Note: Bullets represent the level of perceived improvements: ● – high, ◕ – medium, ◑ – low, ◔ – very low.

Table 3. Recommendations and Recommendation Categories by Respondent Age Group

Only younger respondents point to the possibility of other system choice, which might indicate that the oldest employees reveal a lower awareness of competition and market economy. They might be unaware of market offer and the fact that they do not have to accept the current provider's offer. Such attitude of older employees seems to reveal the specificity of transition economies, i.e. economies being in transition from centrally planned systems to free market systems (Soja and Cunha 2015).

Trainings might be improved in several ways: quality improvement, better timing (more time, earlier), scope extension, and inclusion of more employees. Better organization of training time is of great importance for older employees. They point to the need for greater amount of training time and also to the fact that trainings should be organized earlier. They seem to perceive the training-related issues from their own perspective (age), being aware that they need more time for acquiring knowledge (e.g. Hill et al. 2008, Ilmarinen 2001). Younger employees, on the contrary, expect a broader scope of trainings and do not pay special attention to timing. The perception of the need for inclusion of more employees in the training program seems to grow with age. This might be connected with a growing number of older employees in companies and a more personal approach to difficulties connected with IT use revealed by older people. Improvement of training quality is more important for middle-aged and older employees, and is of lesser importance for younger people.

Recommendations related to provider are formulated by both older and younger respondents. However, there is a difference in an approach to this issue between younger and older, also noticed in other recommendation categories. This difference boils down to a more personal approach revealed by older respondents. In particular, the oldest respondents perceive the provider through contacts with individual, specific people, i.e. consultants. Younger respondents, in turn, tend to perceive cooperation with provider from the perspective of organizational and legal considerations, such as support, agreement, and competences.

Implications

The current study brings a number of insights into the role of the older workers in the process of enterprise system implementations and other ICT-related initiatives. It suggests some implications for team building during the project and sheds new light on the idea of balanced team composition. In particular, the point might be not only to balance the team with respect to business areas of team members, but also it is worthy to take into consideration age of participants. Such recommendation might refer to both adopters and providers.

While performing the organizational diagnosis prior to the implementation project start, it is definitely worthy to take into consideration many stakeholders, both younger and the oldest. In the area of project management the greatest contribution might be expected from the middle-aged employees, as they are appropriately educated about modern management techniques and possess substantial experience. With respect to the general possibility of improving the system, connected with infrastructure and fit to company needs, the opinions of younger and older employees are consistent. More detailed solutions, demanding knowledge of new technologies and system approach are more often proposed by younger employees. It appears that extending trainings in time and ensuring adequate time for trainings become more important with age. Younger employees, in turn, expect more complex training programs. In the area connected with provider, it appears that emphasis on issues connected with cooperation with people is growing with employee age.

Drawing from the analysis and discussion we can formulate a number of recommendations aiming at supporting the elderly in the process of ICT/ES adoption:

- Company preparation for changes and change management program should take into consideration older people. They should be presented with explanation why the new system/technology is needed and what are the expected benefits from the system use.

- It is recommended to organize trainings on modern management techniques, project management, and market economy. Such trainings should help older employees to supplement their knowledge. This especially applies to those living in the transition economy setting.

- Older employees would benefit from the organization of hands-on trainings on IT skills, which should be adequately long and organized early, preceding the actual implementation process.

- The pace of project tasks should be slower for older employees, which is connected with a reduced rate of learning. However, as suggested by prior research, the ability to learn is not impaired with age (Renaud and Ramsay 2007).

The current study's findings might help overcoming stereotypes connected with the elderly and encouraging them to prolong their professional careers. This might be done by illustrating the work potential of the elderly on the basis of the experience of older employees in ES implementation projects, as explained in the following:

- Older employees are especially useful in their personal approach to various problems – thanks to greater interpersonal skills, experience and awareness of their strong and weak points they should better perceive problems of the elderly and other people being subject to exclusion, especially in the projects introducing changes or new technologies.

- Older employees have high competences as consultants, especially when consulting other older people is concerned. This is associated with greater experience and greater interpersonal skills of older people (Ilmarinen 2001). In addition, senior consultants would naturally be able to adjust the way of consulting to the needs and abilities of older people. Employing older consultants would be a means to overcome mental impediments among the elderly, such as reluctance or fear of changes.

- Older employees are motivated to take part in various trainings as they are aware of the necessity to supplement their knowledge of new technologies. They should be also aware that they may acquire knowledge as younger workmates but at a slower rate.

- Older people are employees who value responsibility, they gradually close their professional careers and hence they tend to compete less with other workmates, which creates a favorable environment for cooperation.

Conclusion

The current study examined the role of employee age in improving ICT adoption projects and built on the experience of enterprise system (ES) practitioners from Poland. Using a data-driven approach, the discovered areas for improvement were divided into five main categories: Project preparation, Implementation process, System, Training, and Provider. In order to investigate the role of respondent age in the perception of recommendations for improvement, we identified the following age groups: younger, middle-aged, and older. The analysis of recommendation distribution by respondent age allowed us to conclude that older employees have people-oriented approach to the implementation project. This is revealed in a greater emphasis placed on employee preparation, IT skills, responsibility allocation, communication, project team composition, better organization of training, and the role of consultants. The people-oriented approach might be considered as a strong point of older people in the context of their experience with ES. However, on the other hand, compared to younger people, older employees need more support in training on modern management techniques, project management, and deeper knowledge of the IT field. One of the interesting avenues for future research might be connected with an in-depth examination of roles played in the implementation project by respondents from individual age groups. Such an investigation might help in better understanding respondent motivations and approaches to the idea of balance between their own careers and company success. It appears that older employees tend to gradually close their professional careers, which might motivate them to a greater responsibility and loyalty to employer.

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