

Vadym Mozgovoy & Tobias Mettler: Internal Development as Access Strategy to Information and Communication Technology in Electronic Human Resource Management for Sustaining Employee Well-Being

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Abstract: This paper examines the access strategies to Information and Communication Technology (ICT) for electronic Human Resource Management (e-HRM) in the context of public service organizations. Emphasizing the importance of public values, such as long-term employee health and well-being, it addresses an emergent and underexplored topic through a narrative review of 12 empirical studies. The findings suggest that the public service organizations use, firstly, internal development and, secondly, alliances as ICT access strategies for managing public servants. The paper discusses practical implications for public and private organizations.

ACM CCS: CCS Social and professional topics Professional topics Computing and business Employment issues

Keywords: Information and Communication Technology, electronic human resource management, resource, access strategy, public service

## 1 Introduction

Digitalized people management practices together with electronic health (e-Health) is becoming particularly important in contemporary changing workplaces [1, 2]. International regulatory bodies consider workplace well-being enhancement to be a legal responsibility of employers [3–5]. A growing number of both public and private organizations take e-Health measures for improving employee health and well-being. At the same time, public organizations have a fundamental difference with private organizations in terms of Human Resource Management (HRM). Specifically, public service organizations, defined as organizations rendering service in the public interest, are governed by public values associated with sustaining the well-being of workers and, accordingly, their health [6, 7]. However, the use of Information and Communication Technology (ICT) for HRM in public service, which is oriented toward long-term employee health and well-being, remains overlooked despite potential positive effects for both public and private sectors.

Indeed, HRM in public service is increasingly drawing on digitalization trend [8–10]. The use of ICT in public service becomes an integral part of a broader concept of electronic HRM (e-HRM). The latter refers to HRM policies, practices and processes integrated with Information Systems (IS) [11]. It includes a wide range of such services as benefit administration, payroll, or time management [12].

Researchers have paid substantial attention to ICT that may support Public Human Resource Management (PHRM) over the past decade [8, 12–14]. From a HR perspective, ICT strongly impacts the job content, similarly to such other situational factors as labor markets, laws, and societal values [15]. The literature in management field reinforces this idea by stating that it is not possible to adopt e-HRM successfully without sufficient technological and organizational support at the same time [11].

The e-HRM technology supports the overarching HRM meaning and content instead of simply proposing a technologically functional HRM process [16]. Simultaneously, e-HRM technology choices should fit with strategic Human Resource (HR) role of a strategic positioner, a capability builder, technology proponent, change champion, HR Innovator or Integrator, adopted in an organization [17, 18]. Thus, in order to make a positive strategic contribution to HRM, selected ICT access strategy for e-HRM should be consistent with the HRM in public service organizations.

Accordingly, the ICT represents a critical resource in e-HRM for public service organizations [12, 19, 20]. However, the e-HRM literature does not address the question how public service organizations access the ICT, despite the strategic importance of this resource.

Following this line of thinking, the ICT literature recognizes the importance of sustainability from Human Resource Management perspective in strategic IS considerations [21]. The ICT literature discusses innovation management in public service organizations [20], ICT typology in PHRM [12], or ICT implementation phases [22]. A number of authors discuss ICT typology and implementation in public service organizations [13, 19, 23]. At the same time, the HRM literature calls for development of knowledge on ICT use in public service context [8, 12]. However, the types of ICT resource access strategy for e-HRM in public service organizations remain underexplored.

This paper examines the ICT access strategies for e-HRM in public service that prioritizes the employee health and well-being as public value. This paper addresses this research problem by drawing upon a narrative literature review methodology [24–26]. It reviews 12 selected academic peer-reviewed studies on public service organizations. The sample size of sources under review is limited due to recency of ICT integration with HRM function and scarce research on this topic up to date. However, a narrative literature review is a research methodology brings analytical rigor as well as transparency in the literature review process, contributing to the credibility of findings in this case [27].

The remainder of the paper is structured as follows. The next section outlines the methodology and describes the public service organizations in retained sources. Then, the literature findings are summarized. In conclusion, the paper outlines key strategies of ICT access in public service organizations and suggests future research directions.

## 2 Methodology

This paper addresses emergent and underexplored topic of ICT access for e-HRM in public service organizations prioritizing the employee health and well-being. It uses a narrative literature review methodology, particularly suitable for appraising results of previous studies in the situation of currently lacking knowledge, by contrast with systematic literature reviews addressing narrowly defined queries [24–26, 28]. The literature search for the narrative review performed by describing and appraising peer-reviewed published articles has taken several steps. First, peer-reviewed academic articles written in English were located in the online databases EBSCO and Web of Science. Second, Boolean searches included the keywords “electronic Human Resource Management” “electronic HRM”, “e-HRM”, “eHRM”, “virtual HRM”, “digital HRM”, “public service,” “public sector”, “organization” “governmental,” “municipal” without a time frame limit. The snowballing technique was used for searching additional articles.

Third, the inclusion/exclusion criteria for literature selection were applied as described below. Retained studies used the empirical data exclusively from public sector. It means that the selection excluded studies examining private, non-for-profit or non-governmental organizations or comparing the efficiency between these and public sector organizations. Sources that does not involve the integration of HRM practices with IS, literature reviews and conceptual papers were also excluded from the selection. The first two literature search steps have identified 135 sources. 35 sources were excluded of the total of 135 relevant abstract screened. Nineteen papers were excluded due to the lack of focus on public service or empirical data analysis. Four sources were additionally excluded due to incomplete reporting of findings. Finally, 12 articles were retained for a literature review.

The search process has resulted in the identification of 12 papers on e-HRM in public service. Retained articles were critically analyzed previewing, annotating, summarizing, comparing and contrasting, as well as final synthesizing. Extensive analytical tables were developed in reference software management CITAVI and in dynamic tables developed in Excel (MS Office) to facilitate the appraisal of retained sources and synthesis of finding. While the literature review was conducted in 2019, selected sources were published between 2006 and 2017 (Table 1). They include 3 papers in periodicals in the field of information system management (Expert Systems, Industrial Management and Data Systems, Journal of Enterprise Information Management) and 9 papers in periodicals in the field of human resource management (3 papers in International Journal of Human Resource Management, 2 papers in Employee Relations, 2 papers in Public Personnel Management, 1 paper in Personnel Review, 1 paper in Human resources for health).

Paper Code	Full title of the source
A [29]	The link between e-HRM use and HRM effectiveness: An empirical study
B [30]	Unveiling the Value Creation Process of Electronic Human Resource Management: An Indonesian Case
C [31]	The strategic value of e-HRM: Results from an exploratory study in a governmental organization

Paper Code	Full title of the source
D [16]	Does e-HRM lead to better HRM service?
E [32]	e-HRM effectiveness in a public sector organization: A multi-stakeholder perspective
F [33]	Factors influencing E-HRM implementation in government organizations: Case studies from Bangladesh
G [34]	The contribution of e-HRM to HRM effectiveness: Results from a quantitative study in a Dutch Ministry
H [35]	Intelligent information processing in human resource management: An implementation case in China
I [36]	Tipping the scales: Ambidexterity practices on e-HRM projects
J [37]	Human Resources Information Systems in Texas City Governments: Scope and Perception of its Effectiveness
K [38]	Human Resource Information System implementation readiness in the Ethiopian health sector: A cross-sectional study
L [39]	Exploring the public sector adoption of HRIS

Table 1 : Literature Sources

The number of public service organizations studied in each paper varied. There were 67% of studies carried out in one public service organization, and others included from 2 up to 88 organizations. The sources under review covered different public service sectors, the different level of government, which enhances the generalizability of research findings. All the sources used samples from one country only. The studies under examination included national (50%), regional (8%), local (33%) and non-specified (8%) government levels.

The sample covered a variety of public service activities and civil servants with different status. Organizations included ministries, a large federal governmental agency, regional public health organizations, municipal administration, education, financial services, natural resources, utilities, defense, manufacturing, communications and media. One study used a sample of a partially state-owned enterprise (SOE) in Jordan with 60% of state ownership. There was no specification of state ownership share in 11 public service organizations in Australia. Overall, 1'535 respondents participated in the studies under review from employee up to Human Resource Director levels; the hierarchical status of some civil servants was not specified.

Seven out of twelve reviewed studies used a survey research strategy, taking a mono-method or mixed-method approach in combination with a narrative enquiry, according to research methodology classification [40]. Four studies relied upon a narrative enquiry strategy, using one-on-one interviews and focus group discussions. Surveys used descriptive and inferential statistical quantitative analysis, while studies involving narrative enquiry used mainly qualitative content analysis. Besides survey and narrative enquiry, there was one case study and one action research study. They involved mixed methodology and data triangulation through additional internal documentary observation. There were no studies using pure experiments, archival research, ethnography, or grounded theory building as research strategy. All the papers used a cross-sectional design, and there were no longitudinal studies. However, the reviewed studies covered an extensive period of time in terms of user experience with e-HRM,

starting from 5 years, and they did not examine the process of the e-HRM implementation and respective change management.

### **3 Results**

The results from this narrative review are organized around the ICT access strategy as the key theme, associated with the ICT use in e-HRM in public service, that have emerged during the literature review. Management literature distinguishes four main strategies for accessing resources [41, 42]. They include resource service purchase from a third party firm (1), internal development within an organization (2), acquisition for gaining property rights over a resource (3), and strategic alliance with another partner firm (4) [41, 42].

These strategies differ substantially. Service of resources purchased from a supplier that controls them on market conditions is the first access strategy [42]. Internal development of a new resource that will be owned an organization under its control is the second strategy [42]. Acquisition of a resource is the third strategy, when present resource employer transfers ownership of existing resources to the new acquirer [42]. Finally, alliances represent the fourth strategy of resource semi-permanent access, when the resource service or replication occurs under the current resource employer's guidance [41, 42].

The review starts with examination of e-HRM in public service and then moves to the ICT strategy identification. First, public service organization type is analyzed (1). Second, the HR tasks are examined (2). Finally, the ICT access strategy is analytically identified, based on the review results (3).

Public service organization type is the first analytical theme (1). Worldwide geography of the studies shows that digitalization is a current issue in PHRM. The review indicates most studies were conducted in the European Union. Yet, some studies were undertaken in the US, Australia, Asia and Africa. In 42% of cases, the researchers conducted their studies in European governmental and municipal organizations (Belgium, The Netherlands, UK). There were 25% of studies taking place in Asia (Bangladesh, China, Indonesia) in governmental, municipal, and other public sector organizations. The remaining studies represented 33% of the sources. There was one study in a municipal administration covering 88 municipalities in North America (State of Texas, USA). There was one study on e-HRM in public service organizations other than governmental or municipal administration in Middle East (Jordan), Australia and Africa (Ethiopia).

The ICT for the HR tasks studied in the sources under review is the second analytical theme (2). Reviewed papers confirm the critical character of ICT resources in the context of e-HRM adoption in public sector. The result show that characteristics of technology are an important factor of e-HRM and HRM service quality [16]. Public service managers clearly identified the resource access (Infrastructure) among major factors influencing the e-HRM adoption in the context of Ethiopian public healthcare [38]. This research confirms earlier findings from the research in 11 Australian public service organizations in various activity sectors, based on the in-depth interviews with 16 Heads of HR departments or team leaders having knowledge on HRIS [39]. These activity sectors included Communications and Media, Education, Health, Financial services, Natural resources, Utilities, and Defense.

A very limited number of studies used stand-alone applications. The majority of public service organizations used HRIS solution, thus opting for a systemic approach to ICT. This finding goes in line with the idea that the use of an e-HRM system instead of isolated e-HRM applications plays a significant role in PHRM [35].

Overall, the studies we reviewed have shown that public service organizations use internal development, strategic alliance for accessing the task technology for e-HRM, or do not communicate about their strategic resource access (Table 2). The research in the Australian public sector [39] has not specified the brands, sources or access strategy to the ICT technology for confidentiality purposes. Similarly, the public service

organizations in the UK and the USA did not communicate about their IT solutions. By contrast, public service management in Ethiopia has decided not to implement the e-HRM due to low readiness for it across the regional public hospitals [38], and did not specify the task technology for the e-HRM accordingly. The results are summarized in Table 2.

Paper Code	Public service organization type (Country)	ICT for the HR tasks or	ICT access strategy
B	Ministry (Indonesia)	Application SIKKA	Internal Development
D	Ministry (Belgium)	DeBorhah system	Internal Development
F	Ministry (Bangladesh)	Non-specified HR Information System (HRIS)	Internal Development
H	Fully state-owned manufacturing enterprise (China)	Non-specified HRIS	Internal Development
A	Partially state-owned communications and media organization (Jordan)	Oracle HR system	Alliance
C	Large federal organization (Belgium)	Oracle HR system	Alliance
E	Ministry (The Netherlands)	UNIT4	Alliance
G	Ministry (The Netherlands)	UNIT4	Alliance
I	Municipal administration (UK)	Stand-alone ICT application	Non-specified
J	Municipal administration (USA)	Non-specified mix of HRIS and Web applications	Non-specified
K	Regional public health organization	Non-specified HRIS	Non-specified
L	Various public sector organizations	Non-specified ICT	Non-specified

Table 2 : Public Service Organizations and ICT Access

The ICT technology access strategies vary across the public service organizations under review. In four studies out of twelve, the public service organizations used internal development for sourcing the e-HRM technology, such as SIKKA or DeBORHAH systems. They represented organizations in Bangladesh, Belgium, China, and Indonesia. Paper B illustrates internal development of ICT in public service organizations. This research gives a possibility by and factors influencing success of e-HRM implementation and to study the added value brought to organization. The participants were 306 civil servants having diverse characteristics: gender; age; position; experience of work; experience of e-HRM use. The research was held in the Directorate General of Tax Services which is a part of Ministry of Finance in Indonesia. It has implemented the e-

HRM application called SIKKA (Sistem Informasi Kepegawaian, Keuangan, dan Aktiva—Integrated Human Resource, Finance, and Asset Information System). The implementation process started in 2006, and the study was published in 2014. This study addressed several research questions. In particular, it found that a strong HRM system has positive and significant influence on e-HRM acceptance.

Paper D illustrated another public service organization, using internal ICT development. This study investigated the drivers of HRM service quality in a Belgian ministry employing 140 public servants roughly two years after the e-HRM system launch. This organization drew upon an internal DeBORHAH system for e-HRM that was developed specifically for it and tailored to its needs. According to the results of e-HRM implementation in this context, HR practitioners should achieve strong consensus on that system. It is suggested to prioritize the HRM content over IT content. In particular, this study found that HRM service quality also depends on the technological characteristic of e-HRM. It underscores the importance of intrinsic and contextual information and concludes that E-HRM should be viewed as an instrument of HRM support. Thus, technological aspect of G2E services should not replace HRM meaning. Remarkably, both governmental and other public service organizations resorted to internal development of the e-HRM technology. It may be associated with the need to have a long-term strategic vision of PHRM, ability to commit substantial resources to G2E technology, and alignment of e-HRM objectives with public values. At the same time, the earliest operational e-HRM implementation among the reviewed sources had started in Dutch public service in 2002. This shows long-term orientation of e-HRM goals and relevance of internal development of ICT technology for HRM tasks.

In four studies out of twelve, the public service organizations used public-private unilateral strategic alliances for accessing the e-HRM technology, based on licensing agreements with HRIS vendors, such as standardized Oracle HR and customized Unit4 Emplaza systems. Three studies focused on European governmental and municipal organizations, and one focused on a partially state-owned enterprise in Jordan. Thus, mainly developed countries used strategic alliances for accessing the e-HRM technology in public sector.

Paper E is a representative study of a public service organization, using alliance strategy for accessing the ICT technology. The qualitative study aimed to explore the relationships between the perceived usefulness and ease of use of e-HRM tools and HRM effectiveness in The Ministry of the Interior and Kingdom Relations in the Netherlands. It focused on e-Career Development as e-HRM application, provided by UNIT4 Emplaza. Its findings show that the e-HRM, including selection of ICT access strategy, in public administration are effective, when they are aligned with HRM activities.

Paper C is another example of the alliance strategy. An exploratory single case study was conducted in the Belgian Federal Public Health Service [31]. Strategic benefits of e-HRM were examined through careful selection and integration of quantitative and qualitative data involving a survey, face-to-face semi-structured interviews, focus groups and documents from 2006 to 2009. It focused on e-HRM system with various e-HR applications in the Oracle HR project implemented 7 years ago.

Only 2 internal and external training modules were used in  $\frac{3}{4}$  of cases among 16 e-HRM modules. The e-HRM applications were used rarely, though the users were satisfied with their experience. It suggested that strategic advantages of e-HRM can be fully realized, but only under certain conditions. Findings in Belgium showed that e-HRM should be aligned with the HR function to have positive long-term effects on organizational capabilities.

At the same time, alliance strategy offers less flexibility and lower control over the ICT resources, compared to internal development. In this vein, literature review has revealed the tensions between the HRIS vendors tending to standardize the production and high customization needs, associated to the HRM content in public service [39]. Organizations

willing to minimize costly customizations had to engage in negotiation process. As result, the public service managers had to reach the organizational fit between ICT access strategy and HRM in one of three ways either by (1) changing an organizational process to cohere to standard functionality of HRIS, (2) or customizing HRIS, or (3) combining both options.

Paper	Level	ICT integration with HRM	ICT Access Strategy
A	Other public service organization	Part of HR Information System	Public-private unilateral strategic alliance
B	Public administration	Stand-alone e-HRM application	Internal Development
C	Public administration	Part of HR Information System	Public-private unilateral strategic alliance
D	Public administration	Stand-alone e-HRM application	Internal Development
E	Public administration	Part of HR Information System	Public-private unilateral strategic alliance
F	Public administration	Stand-alone e-HRM application	Internal Development
G	Public administration	Part of HR Information System	Public-private unilateral strategic alliance
H	Other public service organization	Stand-alone e-HRM application	Internal Development
I	Public administration	Stand-alone e-HRM application	Non-specified
J	Public administration	Non-specified	Non-specified
K	Other public service organization	Non-specified	Non-specified
L	Other public service organization	Non-specified	Non-specified

Table 3 : ICT Access Strategy by Public Service Organization Level and ICT Integration with HRM

Finally, the ICT access strategy varies depending on the type of public service organization and ICT integration into HRM (Table 3). Organizations prioritizing tailored stand-alone applications opt for internal development, when the ICT development for e-HRM is managed from within (Papers F, B, and D with internal development; Paper I with non-specified ICT access strategy). Most of these organizations represent public administration at ministerial and municipal level across a broad range of geographical regions, which suggests that they possess sufficient resources for investment in e-HRM. A manufacturing fully state-owned enterprise (Paper H) has also adopted such a strategy. However, organizations prioritizing system approach to e-HRM instead of isolated applications opt for alliance strategy of ICT access. It was a less frequent approach, concerning 2 cases (Papers G and E)), discussed in 3 research papers (Papers G, E, and C). Both organizations using such a strategy were representing public administration institutions at governmental and ministerial levels in European Union countries. Such a strategy was also adopted by a semi-state-owned, or SEO, communications and media organization (Paper A).

Interestingly, no evidence of international cooperation among public service organizations from a different country was found in the study. Simultaneously, some public service organizations used services of global ICT providers instead of national ICT providers. These results illustrate tensions in terms of the ICT access possibilities and public service objectives.



#### 4 Discussion

Our narrative literature review has found that managers mainly choose the ICT access strategy to the e-HRM technology by deciding to develop it internally (internal development strategy). They also use a strategic approach of accessing the ICT for e-HRM externally (alliance strategy), but to a lesser extent. Temporary resource service purchase from a third-party organization was not used in public service organizations. An acquisition of readily developed ICT solutions and corresponding intellectual property rights held by existing organizations was not used neither.

Results show that there is one dominating ICT resource access strategies in public service, Internal Development. This finding agrees with the e-HRM literature stating that mutual development of e-HRM and overarching HRM strengths at organizational level is required for successful technology appropriation over time [16]. It also shows that many public service organizations invest in ICT in e-HRM tailored to their needs, which goes in line with the achievement of employee health and well-being as long-term HRM goal. Our study also reveals tensions related to resource access, and alliance strategy becomes the second most frequently used ICT access strategy for e-HRM in public service. Previous studies on ITC technology for PHRM have shown that ICT procurement, sourcing and contracting as challenging areas in PHRM [43, pp. 198-200]. The literature review findings showing that public service organizations use alliance strategy with ICT specialist firms from private sector for accessing the standardized ICT resources parallel this literature.

This study is subject to several limitations. First of all, this study findings are limited by the methodological choice. A narrative literature review does not provide a clearly predefined planning assumptions, it may be subject to evaluation biases, and this type of study is not reproducible [24–26, 28]. However, the narrative literature review is particularly suitable for such a newly emergent phenomena as the ICT access in the e-HRM field. The sample of 12 studies may limit the generalizability of findings. However, the recency of the e-HRM introduction in public service and low number of studies published on this topic justifies the number of sources reviewed. Second, a substantial number of public service organizations did not communicate about their ICT access choices. Furthermore, e-HRM is one of strategies supporting the HRM, and public service organizations may use other relevant tools for achieving HRM goals [43].

#### 3 Conclusion

The findings of present study reveal that ICT access strategies for e-HRM in public service requires further scholarly consideration. Future interdisciplinary research in ICT, strategic management, and e-HRM should examine the ICT access strategies further. Future studies should pay particular attention to examining the technology access for the e-HRM in public service organizations with different activity types. Similarly, mediating and or moderating factors influencing the choice of ICT access strategies for e-HRM should be examined further.

In term of practical implications, ICT should be tailored to organizational needs in e-HRM in digitalized people management practices enhancing the employee health (e-Health). This implication may be used in the context of both public and private organizations using the ICT in HRM for improving the employee health and well-being. Organizations are governed by public values associated with sustaining the health and well-being of workers [6, 7]. Public servants' well-being sustained over time is a particularly important strategic goal of the HRM for public service [43], and internal development of ICT for e-HRM supports the achievement of this strategic goal. However, even if internal development may not be a major ICT access strategy, the principle of adapting the ICT solutions to long-term HRM goals in terms of employee well-being may be successfully adopted. To conclude, both public and private organizations may negotiate the access ICT solutions more tailored to their HRM in order to promote long-term employee health and well-being through e-Health systems, stand-alone applications, or interventions.

## Literature

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