Adoption of Human Resource Information Systems in Danish SMEs

A. Scupola and Z. Pollich

Abstract. This paper examines the determinants for Danish SMEs to adopt Human Resource Information Systems (HRIS). To do so the paper applies the Technology, Organizational and Environmental (TOE) framework of innovation adoption and qualitative analysis. Perceived benefits, organizational HRIS knowledge and expertise and top management support are proven significant in driving HRIS SMEs' adoption decision in the four cases. With the use of HRIS, SMEs HR management has especially improved work efficiency and been able to grow faster.

1. Introduction

Human Resource Information Systems (HRIS) are systems considered to be part of an organization's Management Information System. HRIS is defined as a system used to acquire, store, manipulate, analyze, retrieve, and disseminate information regarding the human resources within an organization (E.g. Lippert and Swiercz, 2005). It is a form of Human Resource (HR) software that combines several HR processes, such as retaining, recruiting, administration, managing payroll, HR planning, performance record, employee self-service, scheduling, absence management analytics, etc. HR management software is widely used by companies to ensure easy access of human resource data and management of employees' performance. HRIS is designed to facilitate administrative and strategic HR in an effective and competitive way (Poutanen and Puhakka, 2010, p. 5).

Traditionally, HR systems are based on client server, and require high capital investment. In the 90s, the emerging use of Internet makes web-based HR solutions more accessible to remote teams in global enterprises. However, it was still mainly used for administrative and operational purposes and usually an application of Enterprise Resource Planning (ERP) systems. In the 2000s, HR software is designed for tackling specific tasks rather than just being an integrative ERP system. Employee Self Service (ESS) and Management Self Service (MSS) systems become prevalent in the late 2000s. With these applications, employees or managers can initiate and complete HR transactions without HR staff involvement. The range of transactions is highly configurable, and the access to the specific transactions are constrained depending on the employees' role (Florkowski and Olivas-Lujan, 2006). Potential employees can log into the system and apply for a position. Employees can view their

own personal information and handle transactions such as travel reimbursement, vacation time, etc., while managers can approve employee-related transactions (Shani & Tesone, 2010) with the consequent delegation of responsibilities and activities shifting from HR professionals to employees and managers. This leads to more strategic HR focus, as the automation replaced time-consuming paperwork, but at the same time, it also leave some challenges for HRIS implementation in an organization. Managers are frustrated with extra administrative tasks and employees need guidance and motivation to adapt to the new system (Shani and Tesone, 2010, p35). In 2010s, cloud and mobile deployment became a standard in HR software, providing users easy access and reducing costs of physical storage and IT support. The new cloud technology Software as Service (SaaS) offers several benefits including ubiquity, document control, and automatic updating, thus it has changed the HR software market, with increasing number of SaaS vendors and more solutions for SMEs. It can be said that the HR software is also specialized depending on the business size and needs. Large enterprises tend to use integrated HR systems or ERP while smaller enterprise tend to use specialized software. As today's HRM, focus is on fast talent sourcing, namely proactive searching for qualified job candidates; in this process, cloud-based talent management is playing a key role. In 2015, gamification features are introduced, which makes the work atmosphere more fun and interesting for employees. In 2016, HRIS with video features became popular among recruiters, which saves money and time on the recruiting process. From this historic development of HRIS, it can be seen that over the last few decades, the software delivery model has changed from on-premise to on-demand; the software's purpose has been shifted from administration to talent management, SaaS enabled HRIS is expanding into SMEs. This is relatively a new trend, as traditionally company size has been a driving factor of IT adoption, and SMEs were believed to face more barriers in IT adoption.

In addition, few empirical studies explain the increasing HRIS adoption among SMEs. Thus, it is interesting to examine the different drivers of SMEs HRIS adoption. This research is particularly interested in exploring the recent trend of HRIS adoption in Danish SMEs. Denmark ranks number 2 on the Information and Communication Technologies development index in 2013 in terms of information and communication technologies' access, usage and skills according to the International Telecommunication Union (https://www.itu.int/en/ITU). SMEs represents 99.7% percent of the enterprises in Denmark (European Commission, 2016). Yet, there is little research about Danish SMEs HRIS adoption, therefore the research question to be investigated in this paper: What are the determinants for Danish SMEs to adopt HRIS and why? To answer the research question a qualitative investigation is conducted in four Danish companies.

The paper is structured as follows. First, a literature review is provided and the theoretical framework presented, then the methodology is described. This is followed by a presentation of the preliminary findings and the conclusions.

2.0 Literature review

2.1 HRM

HRM (Human Resource Management) is the management of human resources, which is usually executed by HR departments. They are responsible for employee benefits design, employee recruitment, training and development, performance appraisal, payroll and rewarding systems (Boon & Paauwe, 2009) and accordingly HR professionals can specialize in recruitment, training and development, employee-relations or employee benefits.

Today, as business become globalized and the competition intensified, it is even more important to attract top talents to stay competitive in the industry, and this demand has resulted in an even greater need for HR management to offer positive employee experience. HR management's focus has shifted significantly to managing employee experience. International HR professionals realize the need of HR department as a service organization to examine and optimize their employee journey map, strengthen employee engagement and revamp performance reviews. Besides, the labor market is increasingly characterized of short-term contracts and freelance jobs and teamwork is often made of people with specific skills rather than fixed job positions. This requires HR professionals to react faster to identify the tasks, and source the employees with the required skills, so the project team can quickly perform the tasks. Leveraging technologies may improve this process, therefore companies and HR professionals have realized the growing importance of using information technology in leveraging their HRM needs.

2.2 HRIS Types

Today's HR software can be broadly classified into human resource administrator segment and talent management segment. With the new cloud technology -- Software as a Service as a key driven factor, the HR software market is shifting their focus from administrator to talent management segment. Companies can adopt one specialist system focusing on core HR functions or integrated HR functions in one system, depending on their needs. The new HRIS still include the basic administrative functions such as payroll and personal data administration, but updated with end-to-end feature and more user-friendly access. Furthermore, the new HRIS can collect and centralize all employee data, generate automatic transactions thus improving other functions such as talents management and performance management.

The human resource administrator segment typically contains functions like payroll, time and attendance and benefits administration. Time and attendance keeps track of employees' working hours on a task; benefits administration follows the employees' participation in benefits programs such as pension, compensation and insurance. With payroll function, HR administrator put in the employee's wage information and working hours, then the system automatically calculate wages, generate deposit and employee tax reports, and deliver payment to employees bank accounts.

Employees can also login into the payroll system to check their personal information and salary.

These functions can be highly integrated with finance systems, and coordinated between the finance department and HR department. The HR administrator collects these data, the finance system analyses these data and makes the budget.

Talents Management segments encompass recruitment, performance management, learning and development and compensation management (Little, 2010). Talent management system can be a standalone application or a suite of applications aiming at supporting employee journey. This segment improves HR processes from hiring, to training, and succession planning. At the same time, these HR processes also make up an employee journey, which HRIS pay attention to today. The new concept of employee engagement replaced talent management with the purpose of motivating and retaining employees, but the functions remain similar. Both can help companies achieve talent acquisition and retention.

As aforementioned in HRM, the role of talents acquisition has been more important to companies than ever and the market of recruitment software has been growing rapidly. With cloud-technology like SaaS, the online recruitment-featuring applicant tracking system is now commonly used by HR professionals because of its efficiency and low cost. For companies or recruiters, it does not require installation and maintenance is provided by the vendor on the subscription base. Besides, the increasing number of Software as a Service vendors in the market has driven the price down, making it more affordable for SMEs (Robinson, 2004). For HR staff, it streamlines the recruitment process automatically, centralize both the data and communications in one place, it can also customize workflow, fields, forms and form layout and e-mail communication. This significantly improves the recruitment process and the recruiters' productivity. In addition, anybody familiar with internet browser can use the system, which makes it easy for applicants and executives (Robinson, 2004).

Apart from talent acquisition, talent retention is also being highly valued. Talent retention is supported by learning management system, performance management systems and compensation systems. Learning management system is an application that administrates, tracks, reports and delivers training programs. It can automate the process of on boarding a new hire or off boarding a retired employee, develop employee skills as well as retain knowledge (Ellis, 2009). Performance management applications provide real-time performance tracking, goal setting and feedback, and it ensures the organizational goals are being continuously met effectively (Ellis, 2009). Sometimes performance management is incorporated into learning management system. Compensation management designs reward system for employees' performance and it is frequently integrated with performance management. These three applications with people-centric feature have been increasingly popular recently, as they encourage employee engagement and retention, and create an employee-centric learning environment (Bersin, 2016). In the end, they build an agile organization and help companies achieve organizational effectiveness and strategic competence. HRIS types can also be distinguished by its approach of E-HRM. Ruël et. al. (2004) recognize three different approaches of E-HRM: (1) Operational --- the company focus on the automation of basic HR administrative tasks, e.g. payroll administration and personal

data administration. This can be the result from the adoption of human resource administrator. (2) Relational – the company uses HR tools to support the business pro-

By E-HRM Approaches	Operational: Administrative tasks	Relational: Business processes	Transformational: Strategic activities
By HRIS segments	⇓ Administrator: Payroll, time and attendance, etc.	⇓ Talent Management: recruitment, training, performance management, etc.	⇓ Integrated HR suites

cesses such as recruiting, on-boarding, off-boarding, succession planning, etc. This can be associated with the adoption of talents management system streamlining the business processes. (3) Transformational --- the company focus on strategic HRM activities in order to support the organizational change process and strategic reorientation or strategic knowledge and

Table 1. HRIS Classification (own elaboration)

competence management. This can be achieved through integrated sets of HR software that enables the employees learn and develop in line with the company's strategic choices (Ruël et. al., 2004).

It can be seen that, the definition of E-HRM types are closely related with HRIS types. That is the result of HRIS adoption and the adoption of a specific HRIS type reflects a company's approach to HRM. A company can choose different approaches and adopt different types of software throughout the time, depending on their business size and needs.

2.3 HRIS adoption in Denmark

According to the report "Market of HR systems in Denmark" (Pedersen, 2013), various types of HRIS are adopted by Danish companies, and it is consistent with the development of HRIS and HRM. Traditionally it is a part of ERP, usually used by international corporations, to integrate all the business processes in one system. Later on, the business software market is booming along with the prevalence of the Internet, HRIS has become gradually specialized as HR operation process management, competence and performance management or one particular HR function. SMEs in Denmark tend to choose specialized HRIS rather than an ERP suite.

3. IT adoption and diffusion theories

As HRIS falls in the category of information technologies (IT), the theories of IT adoption and diffusion is applicable here in explaining the phenomenon of HRIS adoption.

The most used theories in this field are diffusion of innovation (DOI) (Rogers, 1983), technology-organization-environment framework (TOE) (Tornatzky and Fleischer, 1990), technology acceptance model (TAM) framework (Davis et al., 1989), theory of planner behavior (TPB) (Ajzen, 1991) and unified theory of acceptance and use of technology (UTAUT) (Venkatesh, & Zhang, 2010). TAM, TPB and UTAUT explains individual end-user level of adoption. TOE framework illustrates factors of IT adoption and implementation at firm level. DOI explains how technology adoption and diffusion happen in an even broader context, covering individual, organizational and social elements. This paper chooses to use TOE framework in the investigation since TOE framework suggests technological, organizational and environmental factors drive IT adoption, which is the subject of this paper.

3.1 TOE framework and SMEs

TOE suggests three factors of IT adoption: technological context, organizational context, and environmental context.

Technological context describes both internal and external technologies relevant to the firm, and the current internal practices of the firm as well as the available technologies external to the firm. Organizational context refers to the characteristics and resources of the firm, such as firm size, scope, and managerial structure. Environmental context implies the arena the company operate its business in----industry, governmental incentives and regulations. Even though TOE framework is consistent with DOI theory, TOE framework includes a new component---environmental context, which makes it more comprehensive. Technological factors are often referred as the characteristics of the technology and have been often measured by perceived benefits, which are one major factor determining the adoption of management information system such as CRM and ERP (Alshawi, 2010).

Complexity of HRIS is getting lower and lower, as it starts to have more people centric feature, user-friendly interface and easy access. Besides, HR software is segmented by functions. Apart from the technological characteristics, HRIS, as a tool of facilitating organizational management, it is inevitably driven by organizational characteristics. Top management support plays a significant role in HRIS adoption, as it is top managers the ones making decisions in the organization. Previous research shows this applies to SMEs as well (e.g. Scupola, 2009, 2006, 2003). Top management can include CEO, CFO, CTO, HR manager, marketing and sales manager, etc.

In contrast to big companies, SMEs face some budget constraint, limited economies of scale, requirement of domain-specific technical personnel and skilled workforce. Thus, SMEs desire cost optimization, high productivity and top talents. Adopting recruitment software is crucial for SMEs' fast growth, as performance management systems are important for SMEs' to meet their goals and achieve high productivity.

Affordable cloud-based HRIS certainly help SMEs save time and money finding high-potential employees and efficiently keep the employees' performance in line with the organizational goals.

Organizational maturity (Sierra-Cedar, 2015; Celaya, 2015) and organizational readiness (Kinuthia, 2015; Malak, 2016) are still found important in adoption decision of cloud-based HRIS or other management systems. These two concepts are related, as organizational maturity challenges the organizational readiness for technology adoption (Sierra-Cedar, 2015). Finally, organizational HRIS knowledge and expertise is also driving the adoption. This can be indicated by whether the company's organizational structure has HR and IT specialists.

From an external environmental perspective, adoption of HRIS is usually associated with governmental and regulatory reporting requirements for employees and organizational trend such as globalization (Shani and Tesone, 2010; Anitha and Aruna, 2014). Globalization implies mobility of high-potential talents and intensified competition. A company can easily recruit high potential talents from foreign countries, however under competition, they have to improve HR service on a global level and optimize cost-savings. This competition's effect in driving SMEs' HRIS adoption is evident in recent empirical research (e.g. Mukherjee et.al, 2014).

Both basic HR administration and employee engagement requires compliance with the regional laws and regulations; HRIS vendors are highly segmented by region and have automatic solutions for compliance. Delivering legal changes in a timely manner, a key requirement for an HR solution, is greatly streamlined (Pruden, 2017). This can be a specific reason for HRIS adoption as well, as without automatic compliance, the human work of compliance might take time. In European Union, there is requirement for employees' data protection, so that personal information will not be leaked and misused. In April 2016, EU Parliament adopted General Data Protection Regulation (GDPR) and it is enforceable to its member countries from May 25th 2018 (eur-lex.europa.eu, 2018), which includes Denmark. GDPR requires that employers only keep a candidate's information for 6 months and afterwards the employer has to either ask the candidate again for permission or delete the profile in the database. This specific regulation can be challenging and inefficient to keep compliance with only manual work. HRIS adoption become inevitable when a company is actively hiring. As this GDPR has only been enforced for the last 2 years, there are very few studies investigating its relation to HRIS adoption. To conclude, the two external environmental factors, competition in talents acquisition and GDPR, can be assumed to be driving Danish SMEs' HRIS adoption.

4. Methodology

When choosing the research strategy, the researcher has to consider three criteria: (a) the type of research question posed, (b) the extent of control an investigator has over actual behavioral events, and (c) the degree of focus on contemporary as opposed to historical events (Yin, 1994, p 4). HRIS adoption happens over time and the explanation of how it was adopted, how it is perceived and why is the adoption differ-

ent need to be traced over time rather than frequencies. Case studies, experiments and histories are all suitable for explaining 'how' and 'why', while case study method is preferred in examining contemporary events, and when the relevant behaviors cannot be manipulated. Using the case study method can cover contextual conditions (Yin, 1994, p13), which is highly pertinent in HRIS adoption.

In comparison to single-case design, multiple-case design is more compelling and robust, since it involves replication logic (Yin, 1994, p45). EU's definition is applied here for SMEs case selection that is companies with full-time employees between 11 and 249.

4.1 Data Collection

This research has applied multi-method qualitative study. The qualitative data are from multiple sources, including semi-structured interviews, the official pages of the adopted HR software, the companies' websites, the companies' LinkedIn pages, and the business information provider Proff.dk and Bisbase.com. Companies' LinkedIn pages are first scanned to explore case study possibilities, and then used for number of employees and to indicate organizational maturity. The official page of HR software provides information about the software, from which the functions and the purpose of the software can be defined.

Semi-structured interviews are the primary data collection technique because of the nature of the research questions and the study. The interviews themes include (1) HRIS classification, (2) management decision of HR software adoption, and (3) HR professionals' perception of the adopted HR software.

In the analysis, relevant data explaining the adoption factors are identified and highlighted in the interview transcripts and then categorized in terms of TOE determinants of HRIS adoption decision. At the same time, relevant secondary data complementing the interview data are also analyzed thus basing the analysis on multiple sources to ensure triangulation

5. Preliminary Findings

The decision-making units of all the four case studies agree on the perceived benefits of HRIS adoption as a significant factor in driving the Danish SMEs' HRIS adoption. The decision-making units also perceive relative advantages, not to be significantly influential in driving the Danish SMEs' HRIS adoption, as only one SME's HR support this relation. Interview data show that other factors such as ownership and partnership could also influence the company's decision in accepting HRIS adoption. Throughout the four cases, both secondary data and interview data confirm the top management support's necessity in accepting or approving SME's HRIS adoption. However, the HR professionals perceive top management's influence on the decision differently at different levels. This could be because HR managers might have different level of influence on the top management, due to the SMEs' different level of centralization and formalization. The findings also show that in the four cases organ-

izational HRIS knowledge, organizational maturity and expertise have significant influence on the SMEs' adoption decision. Respectively one and two companies only mention competition and GDPR as a determinant of SME's HRIS adoption as an influential factor in SMEs' HRIS adoption. This indicates the insignificance of competition as a factor influencing HRIS adoption. Three out of four of the case companies use both human resource administrator and recruitment software to manage HR related data, while one company uses integrated HR systems.

Correspondingly, three SMEs have relational HRM goals and focus on improving the recruitment process, while one has transformational HRM goal and requires more collaboration among employees. However, it should be noticed that, operational goals and relational goals are not exclusive of each other. The data revealed the HR professionals' commonly perceived benefits and complexity in HRIS implementation. The common benefits mentioned include easier recruitment process and automatic workflow as well as ability to grow faster. In relation to the perceived complexity in implementation, the respondents mentioned that the newly adopted HR software are very intuitive and require a few hours to learn, which indicates the low complexity of the recent HRIS. It can be concluded that HR has overall positive perception of the adopted HRIS.

6. Discussion and Conclusion

This research is significant, as it addresses a gap in literature regarding the reasons and results of HRIS adoption in Danish SMEs. The results of this study may be useful to academia, HR leaders implementing HRIS, and leaders in SMEs. It can be concluded that perceived benefits of HRIS adoption are significant in driving the Danish SMEs' HRIS adoption. In addition, the study shows top management support's necessity in accepting or approving SME's HRIS adoption. Organizational HRIS knowledge and expertise as determinants have significant influence on the SMEs' adoption as well as company growth is also a determinant of HRIS adoption. Finally, it can be concluded that HR managers have an overall positive perception of their adopted HRIS, as they are useful in helping the company grow faster, improving HR work efficiency and centralizing employee data in one place.

The study finds the TOE factors --- perceived benefits, organizational HRIS knowledge and expertise and top management support to be significant in driving HRIS SMEs' adoption decision, therefore TOE framework's applicability in HRIS research.

The findings also show that factors such as ownership and partnership could also influence the Danish SMEs' decision in HRIS adoption. This might be a theme for further investigation. Adoption of HRIS incredibly improves HR work efficiency, thus decreasing the job opportunities, since the efficiency of HRIS require less HR paperwork.

Therefore, HRM's focus is shifted to the strategic direction. A HR professional should increase his or her ability in strategic HR management. In addition, any one aiming to become a HR professional should keep himself updated with the technology

change and HRM needs. Intuitive user-friendly software tends to be adopted fast. Moreover, because of the low cost, companies shift between HRIS vendors often. Therefore, HRIS vendors should continuously improve the product feature to keep the clients loyal.

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