A Business Process Modelling Approach for the Conceptualization of Human Resource Information System Design

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Abstract In conventional Human Resource Information System (HRIS) design, objects are used and the implementation is principally based on administrative data management, such as payroll, HR costing and leave and absence management. However, for strategic HRIS, the conventional object based design may not be a superior choice, given that strategic HRIS exhibits the characteristics of rapid strategic business change and business process changing requirements. In our view, a single object in the object based design fails to capture all these process-related changes in an agile manner because a business process often consists of a series of objects (activities). Therefore, the business process modelling based approach may be a candidate for designing an agile HRIS. To that end, we investigate how a KPMG human resource management process model can assist in designing and deploying such strategic HRIS. And this paper provides a method for enabling a strategic HRIS from the perspective of business process modelling that has not been investigated before, to the best of our knowledge.

Keywords: Human resource information system, Business process modelling.

1. INTRODUCTION

Over the last decades, a number of different technologies have been proposed in order to cope with challenges that businesses face in today’s business competitive environment. Today’s environments require flexible and adaptable business applications that can cope with and meet frequent changes in business conditions and policies, such as in Human Resource Information System (HRIS). Business process management (BPM) includes concepts, methods, and techniques to support the design, administration, configuration, enactment, and analysis of business processes (Weske, 2007). The underlying principles of business process management that organizations need to understand in order to manage processes better can be expressed as follows. A business process consists of partially ordered activities that correspond to the operations of their defined business in order to achieve their common goal.

In order to adequately describe a business process like the one depicted above, conceptual business process modelling languages are used to express the different aspects of the process. A business process model consists of a set of activity models and execution constraints between them (Weske, 2007). Each business process model acts as a blueprint for a set of business process instances, and each activity model acts as a blueprint for a set of activity instances.

Business process models are the main artefacts for implementing business processes. Business process analysis and modelling are key activities in understanding business processes and in formulating competitive business process management practices.

In conventional HRIS design, objects are used and the implementation is principally based on administrative data management, such as payroll, HR costing and leave and absence management. However, for strategic HRIS, the conventional object based design may not be a superior choice, given that strategic HRIS exhibits the characteristics of rapid strategic business change and business process changing requirements. In our view, a single object in the object based design fails to capture all these process-related changes in an agile manner because
a business process usually consists of a series of objects (activities). Therefore, the business process modelling based approach may be a candidate for designing an agile HRIS. To the best of our knowledge, only KPMG (2012) has come up with a model that discusses in detail the human resource management (HRM) as a process. To that end, we investigate how a KPMG human resource management process model (KPMG, 2012) can assist in designing and deploying such strategic HRIS. And this paper provides a method for enabling a strategic HRIS from the perspective of business process modelling that has not been investigated before to the best of our knowledge. Our focus will be on multi-national companies.

The next section deals with some of the HRIS characteristics. In Section 3, we present the background of BPM and show how BPM can be related to HRIS. Section 4 provides the motivation of the work discussed in this paper. Section 5 presents how HRIS design can be conceptualised in an agile manner and Section 6 concludes the paper.

2. BRIEF CHARACTERISTICS OF HUMAN RESOURCE INFORMATION SYSTEM (HRIS)

HRIS deals with HR administrative and strategic processes. It is noteworthy that for a Multi-National Company (MNC), the HRIS involves the HR with globalisation aspects and is more dynamic, dealing with cross-cultural issues, subsidiary merging issues and global transfer of HR process issues (Cha, 2013; Ferner, 2012; Wang, 2013; Ozbilgin, 2014; Jackson, 2002; Briscoe, 2012). Here, the need for an agile HRIS is even more pressing.

Human resource management process can be categorised into two (KPMG, 2012):

- **Main HR processes that include:**
  - On-boarding; recruitment
  - Organisation and talent management: organisation management, competency management, position management, talent management, performance management, succession planning and career management
  - Off-boarding; exit interview.

- **Administrative HR Processes that include:**
  - Core HR data management
  - Management information
  - Leave and absence management
  - HR costing
  - Payroll.

By incorporating global aspects (including cross culture, national and international laws, international knowledge management, and transfer of HR processes in MNCs), we are able to extrapolate the HR processes into the HRIS design model. From here, we can easily apply a business process model to capture all consequences of changes in HRIS and hence design and deploy an adaptable and quick-to-change-direction HRIS System, leading to strategic human resource management for international competitive advantage.

The business process model is also able to factor into HRIS System design with the following requirements:

- **Process integration in terms of MNC subsidiary HR processes, labour and union legislations and, subsidiary and parent company strategies.** However, the main issue here is process automation that can be handled by Service-Oriented Computing (details in Section 3).
- **Interaction integration in terms of dynamically updating various stakeholders with, for example, government policies and company procedures, and new laws in a global environment.** The automation process of the interaction integration involves agents and business-rule engines (see Section 3).
- **Information integration in terms of information sharing among various stakeholders, particularly in relation to HR Information System in a global environment.** However, the main design issues here are data access interface and business object description that can fortunately be handled by Web Services Description Language (WSDL).

3. BUSINESS PROCESS MODELLING

Business Process Modelling (BPM) is a method of efficiently aligning an organization with the wants and needs of clients (Smith, 2002). It is a holistic management approach that promotes business effectiveness and efficiency while striving for innovation, flexibility and integration with technology. As organizations strive to attain their objectives, BPM attempts to continuously improve processes - the process to define, measure and improve one’s processes – a ‘process optimization’ process (Verma, 2009; Brocke, 2010).

Employing Information Technology (IT) in conjunction with BPM has been prevalent for over three decades. BPM was evident in the 1970s when office automation was a hot topic, followed by an era of business process re-engineering in the 1990s (Ginige, 2006). According to the authors of (Rosenberg, 2005), business process management is one of the core techniques for managing core business.

Therefore, for an efficient and agile HRIS we require the BPM based design to include:

- a codified universal description language for processes: a method of stating how processes are enacted that is as exact and unambiguous as a computer programming language. This language is the Business Process Modelling Language (BPML);
- business process execution engines;
• service oriented computing; and
• workflow management.

BPML is the underlying semantics of Business Process Management. The book, “Business Process Management, The Third Wave” (Smith, 2002), describes BPML as the meta-language of process, a language for developing process languages that capitalize on BPML patterns. BPML can be adapted for use in different industries by assimilating the required vocabularies. BPML can also accommodate specialised languages to refer to patterns of process design. Every element and every design pattern in BPML can be named and referred to explicitly using their native vocabularies; therefore, an industry can develop its own vocabulary of processes. The main strength of BPM lies in representing discrete, distributed, transactional, computational and collaborative processes in such a field as human resource management. The language is used to establish the manner in which participants work together to achieve common business goals (Smith, 2002).

A business process execution engine provides the execution environment and the infrastructure for business process execution. Several researchers have designed and some implemented business rule engines with features to address the drawbacks of current business rule approaches and also address the problem of business rule automation.

Service-oriented architecture (SOA) is increasingly relied upon by enterprise applications, such as HRIS, to realize standardized interfaces for providing their software services within and across organizational boundaries. SOA advocates that developers create distributed software systems whose functionality is provided entirely by services, as in the case of HRIS. HRIS consists of one or more workflows. In MNCs, if many human resource management workflows remain in non-automated state, clearly the business efficiency will be affected. Frequently, the workflow is in the form of an ad hoc workflow, a major obstacle to the human resource management automation (see Han, 2000). Given the new model of virtual organisations and cloud computing (Aversano, 2002), focus on automation of human resource management workflows is imperative.

4. MOTIVATION

In the management or service discipline, particularly human resource management in an MNC, organizations are actively exploring ways to improve the human resource practices. This process is a complex socio-technical problem-solving activity and HRIS of MNCs continually adapt it in order to maintain a competitive edge. Their main interest is in understanding how such a large process can be agile. The field of Business Process Management has a number of potential solutions for making an HRIS more agile and responsive. That is, “How could we seize all consequences of changes in HRIS, in an efficient and competitive manner that leads to best human resource practices?”

Given that HRIS is becoming increasingly complex in that the current object-based design fails to handle, there is a need for an HRIS design based on process modelling. However, there is a lack of research in the area of HRIS design that regards human resource management as a business process, which is important for strategic HRIS and for applying HRIS to MNCs.

5. CONCEPTUALIZING HRIS DESIGN BASED ON BUSINESS PROCESS MODELLING

In order to implement competitive human resource practices in relation to automation, we need to understand business processes and the process modelling. In the following discussions, we present how we can design HRIS based on business process modelling, instead of using objects. The theoretical model is shown in Figure 1 with the following details.

5.1 Identify HR Processes

By focusing on the Main HR Process and the Administrative HR Process, and the global aspects of the HR management processes in MNCs, we are able to identify the required business processes for the HRIS design. From the identified processes, we would be able to select the processes, interaction and information can be integrated in an optimal manner with best-fit HR practices in mind. The organisation can then maintain a database of human resource process model that can be used in the future for changing business needs and future studies.

In this paper, we focus on a MNC headquarters—subsidiary interaction. The MNC has an HR service of policies, procedures, new HR processes, etc in that it would like a subsidiary to build into the HRIS. From the selected processes for automation and optimisation, we identify a number of issues surrounding the MNC headquarters—subsidiary interaction in order to satisfy the MNC business goals, such as HR change management between the MNC and its subsidiaries.
5.2 Model the HRIS Business Process

In order for an HR business process to be adequately explained in a way that is understandable to all stakeholders (the MNC and the MNC Subsidiaries), it has to be clearly represented as a model.

In the proposed modelling phase, a workflow scenario of a HR process given in natural language will be converted into a representation, such as the Business Process Modelling Notation (BPMN). In general, BPMN is used to communicate a wide variety of information about business processes to different audiences. In order to investigate the use of BPMN in HRIS workflows, the workflow scenarios will be obtained from the MNC headquarters. These problems are part of the HRIS development process. The HRIS has complex workflows between the MNC headquarters and the subsidiaries, and all the other stakeholders in the value chain. The developments may include: setting up a new HR department, HR plans, and developing policies and procedures. If the process is defined and modelled in a notation that both the MNC headquarters and the subsidiaries understand, then the presentation will provide all parties with answers to questions that may arise.

There are various reasons why the MNC’s initial HR service could be changed, some of which are: the MNC may have new requirements; new government policies and legislations warrant continuous change; and the MNC’s subsidiary staff may give input on what is really important in the field of cross cultures. By modelling the above process in BPMN, we will provide a single definition of the MNC headquarters-subsidiary interaction, from which different views can be rendered. This BPMN-unified process representation enables that the MNC headquarters and its subsidiaries can each view and manipulate the same HR process via a representation suitable for them that is derived from the same source.

5.3 Implement the HRIS Business Process Model

In order to execute the HR process, the HRIS process representation using BPMN will be mapped to the Business Process Execution Language (BPEL) (Andrews, 2003), the most commonly used industry business process execution language and a suitable language for implementing business processes. Based on the BPMN representing the MNC headquarters-subsidiary interaction, we are able to automate HR management processes through composition of HR services, consisting of the Main HR Processes and the Administrative HR Processes across all MNC subsidiaries.

5.4 Deploy and Test the HRIS System based on Business Process Model

The HRIS system is deployed in a BPEL server that provides a run-time environment to execute the human resource management processes. Using various test cases, the BPMN from the modelling process can be validated. An HR process is accepted based on the correctness of the test cases. Otherwise, we reject it and review the manner the HR process is modelled and re-model the HR process. The deployment and testing phase is repeated until all the modelled HR processes are validated with respect to the HRIS design.

6. CONCLUSION AND FUTURE WORK

This paper provides a method for enabling a strategic HRIS from the perspective of business process modelling that has not been investigated before to the best of our knowledge, with a view to designing HRIS in an agile manner. Our proposed BPM based theoretical model aims to: (1) design the HR process model with the globalisation aspect in BPMN; (2) identify HR service process, e.g. MNC headquarters-subsidiary interaction; and (3) implement and test the HRIS using BPEL (business process execution process).
Future work includes investigating how our proposed HRIS BPM-based theoretical model can be expanded to information integration in actual HRIS design and implementation.

REFERENCES


