Measures of process harmonization

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ARTICLE INFO

ABSTRACT

Context: Many large organizations juggle an application portfolio that contains different applications that fulfill similar tasks in the organization. In an effort to reduce operating costs, they are attempting to consolidate such applications. Before consolidating applications, the work that is done with these applications must be harmonized. This is also known as process harmonization.

Objective: The increased interest in process harmonization calls for measures to quantify the extent to which processes have been harmonized. These measures should also uncover the factors that are of interest when harmonizing processes. Currently, such measures do not exist. Therefore, this study develops and validates a measurement model to quantify the level of process harmonization in an organization.

Method: The measurement model was developed by means of a literature study and structured interviews. Subsequently, it was validated through a survey, using factor analysis and correlations with known related constructs.

Results: As a result, a valid and reliable measurement model was developed. The factors that are found to constitute process harmonization are: the technical design of the business process and its data, the resources that execute the process, and the information systems that are used in the process. In addition, strong correlations were found between process harmonization and process standardization and between process complexity and process harmonization.

Conclusion: The measurement model can be used by practitioners, because it shows them the factors that must be taken into account when harmonizing processes, and because it provides them with a means to quantify the extent to which they succeeded in harmonizing their processes. At the same time, it can be used by researchers to conduct further empirical research in the area of process harmonization.

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1. Introduction

Many organizations have multiple applications that support similar tasks in the organization. Clearly, this is an undesirable situation. On the one hand, because (higher) license fees have to be paid to multiple software vendors. On the other hand, because the benefits of having information consolidated in a single place are forfeited. For example, often organizations do not know which products are bought or sold by multiple organizational units, because that information is not stored in the same system and the products do not have the same product codes. If they had that information, they could achieve economies of scale. In an attempt to remedy this situation, organizations are consolidating their application portfolio [30]. However, to consolidate the applications that are being used in the organization, the work that is done with these applications must also be harmonized [37]. This is known as

process harmonization. Process harmonization is the activity of designing and implementing business process standards across different regions or units, so as to facilitate achieving the targeted business benefits arising out of standardization, while ensuring a harmonious acceptance of the new processes by the different stakeholders [17]. These benefits include the ability to re-use information systems between different processes and departments that work partly in the same manner. It is important to note the relation, but also the difference between process standardization and harmonization that are implied by this definition. Processes harmonization aims to implement process standards, same as process standardization. However, standardization strives for uniformity of processes, while harmonization allows for more variation to ensure harmonious acceptance of the standard [43]. We will discuss the relations and differences between standardization and harmonization in more detail in Section 2.

The increased interest in process harmonization has been expressed in theoretical efforts: (1) by researchers explaining the concept and (2) by practitioners describing methodologies to

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harmonize business processes. However, these theoretical efforts do not identify performance measures to evaluate the extent to which process harmonization was achieved. Nor do they investigate further links with the improvements that are achieved as results of harmonization efforts. Still, performance measurement is of critical importance for organizational management [11]. At a process level, measurements provide information to control and manage processes in order to improve them. "Unmeasured and unchallenged performance does not improve" [14]. Given the importance of process harmonization in process improvement as has been attributed in the literature [19,22], there is a need for measures to evaluate to what extent processes are harmonized (i.e. to what extent standards were implemented).

Therefore, the aim of this study is to develop and validate a set of operational measures to evaluate the level of harmonization of business processes in an organization. This set of operational measures is useful for two main reasons: First, researchers can use them to develop normative theory based upon empirical investigation of process harmonization; and second, practitioners can use them as a mechanism for making informed decisions about specific actions to take with respect to the harmonization of processes and to gain insight into the results of those actions. Measures provide direction of which aspects of the process harmonization can be improved.

Based on this motivation, the main research question to be addressed by this study has two parts:

G1: What factors influence the level of process harmonization of business processes in an organization; and
G2: What measures can be used to evaluate the level of harmonization of business processes in an organization?

An integral approach for construct measures and validation procedures has been followed to achieve the goal of this study. It is based on the approaches proposed by Churchill [5] and MacKenzie et al. [26]. It is divided in two phases: an exploratory phase and a confirmatory phase. The approach uses different methods for data collection, including literature review, interviews with experts, workshops and an online survey, to gather different views of the concept. Our study extends the extant literature by developing a higher order construct, taking into account the most recent insights in the academic literature about how to correctly specify higher order constructs, using a Partial Least Squares (PLS) analysis [2,31].

The remainder of this document is organized as follows. Section 2 introduces the concept of process harmonization in more detail. It also introduces the related concepts of process standardization and process complexity and the relation between these concepts. Section 3 presents an overview of the methodology followed to conduct this study. Section 4 presents the analysis of the data and intermediate results and Section 5 presents the final results. Section 6 presents the conclusions, limitations and future work.

2. Application consolidation, process harmonization and related concepts

Application consolidation is the effort of reducing the number of applications in the organizations that perform similar tasks [30]. Since applications, and especially ERP systems, support the business processes of an organization, this requires that those processes are also consolidated [37]. One of the ERP systems that explicitly identifies the relation between ERP and processes is SAP, which provides a collection of processes that are supported by the system [10].

Process harmonization is the activity of aligning different variants of a family of processes, by capturing their commonality and variability in a consolidating and efficient manner, without attempting to make different processes identical. Harmonization accepts that different stakeholders in an organization have different, possibly conflicting, requirements for a process, depending on their context. This means that, when harmonizing processes, differences between the process variants for which there is no particular reason should be resolved, while differences for which there is a reason can remain. Different conceptualizations of process harmonization have been adopted in the literature [17,35,42]. A precise specification of what we mean by process harmonization is dependent on the research stream that we decide to adopt. In this section two opposite research streams are discussed to derive a systematic and theoretical basis for process harmonization. The first stream consists of literature in which process harmonization is treated as similar to process standardization at a local level, across different locations, regions or organizational units. For instance, Fernandez and Bhat [17] defined process harmonization as "the activity of designing and implementing business process standards across different regions or units, so as to facilitate achieving the targeted business benefits arising out of standardization, whilst ensuring a harmonious acceptance of the new processes by the different stakeholders". In this stream, standardization is defined in a broader sense in which local standards can also be the result of standardization efforts. In contrast, the second stream distinguishes differences in goals between harmonization and standardization. In this stream, the goal of process standardization is to achieve uniformity of process activities across the value chain and across firm boundaries [42], pp. 2011–2012), while the goal of harmonization is to align similar processes based on a single, focused business objective ([23], p. 169). However, when analyzing the differences between harmonization and standardization as they are discussed in these two streams, we notice that differences only exist with respect to strict standardization. In this strict view, standardization leads to a single unified process that does not allow variability (Richen and Steinhorst, 2005). However, in a more broad view, local variations on the standard process are also allowed. Therefore, we claim that harmonization and standardization are similar concepts that differ only with respect to their focus: standardization stresses the unification of processes, while harmonization stresses a trade-off between global unification and local variation.

As an example, Fig. 1 shows two tendering processes that could run in the same company, supported by different software applications. The processes are similar, but contain differences as well. The differences exist with respect to the tasks that are performed, their labels, the order in which the tasks are performed, and with respect to the level of authorization that the internal customer has. In particular, the second process variant includes a market survey that the first variant does not have and the order in which the 'Prepare RFP' and 'Define eval. criteria' are performed differ. Also, the labels of the 'check invitation' and 'receive invitation' tasks differ, hinting that slightly different activities that are being performed in these tasks. The evaluation of the received offers is performed differently between the variants, both concerning the evaluation done by the procurement department and concerning the evaluation done by the internal customer. In the first variant, the internal customer can evaluate all options on the short list, but in the second variant, the internal customer can only approve the selection that is made by the procurement department.

In order to consolidate the applications that support the two processes, the differences between the variants from Fig. 1 need to be resolved. According to our definitions of standardization and harmonization, when fully standardizing the process variants, all differences must be resolved. However, when harmonizing the