

Association for Information Systems AIS Electronic Library (AISeL)

MCIS 2017 Proceedings

Mediterranean Conference on Information Systems
(MCIS)

9-2017

Managing ERP Customization Expectations With Organizational Change Management

Makoto Nakayama

DePaul University, mnakayama@cdm.depaul.edu

Eli Hustad

University of Agder, Kristiansand, Norway, eli.hustad@uia.no

Norma Sutcliffe

DePaul University, nsutcliffe@cdm.depaul.edu

Gajendra Pareek

Vyas Consulting, gpareek@vyasconsulting.com

Follow this and additional works at: <http://aisel.aisnet.org/mcis2017>

Recommended Citation

Nakayama, Makoto; Hustad, Eli; Sutcliffe, Norma; and Pareek, Gajendra, "Managing ERP Customization Expectations With Organizational Change Management" (2017). *MCIS 2017 Proceedings*. 37.

<http://aisel.aisnet.org/mcis2017/37>

This material is brought to you by the Mediterranean Conference on Information Systems (MCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in MCIS 2017 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

MANAGING ERP CUSTOMIZATION EXPECTATIONS WITH ORGANIZATIONAL CHANGE MANAGEMENT

Research full-length paper

N° 8

Makoto Nakayama, DePaul University, Illinois, USA, mnakayama@cdm.depaul.edu

Eli Hustad, University of Agder, Kristiansand, Norway, eli.hustad@uia.no

Norma Sutcliffe, DePaul University, Illinois, USA, nsutcliffe@cdm.depaul.edu

Gajendra Pareek, Vyas Consulting, Illinois, USA, gpareek@vyasconsulting.com

Abstract

The customization of enterprise resource planning (ERP) systems can increase the local benefits of end-users. However, it also increases the costs of development and implementation for every system upgrade. Finding balance is a common challenge. A critical element in the process is organizational change management (OCM). This paper reports the pre-implementation phase results of a longitudinal case study on the relation between OCM and customization at a leading international automobile systems manufacturer: Hanover Auto Systems. The study uses a two-pronged approach: first a qualitative assessment, followed by the development of a research model. The interviews with key project managers indicate that OCM communication on the vision and ERP details is a major challenge and influences ERP customization expectations in the pre-go-live stage. Based on this finding, a research model was conceptualized on ERP customization expectations and local unit benefits. The results of a survey questionnaire to the project managers show that local units inherently expect OCM to increase customization for their benefits. Problems with the OCM vision and organizational support cause OCM problems. This in turn lowers the expectations for wanted customization, because users become unaware of the details of new ERP systems. The implications of our findings are discussed.

Keywords: Enterprise resource planning (ERP) systems, customization, organizational change management (OCM), change vision, data quality, local benefits.

1 Introduction

Customization of enterprise resource planning (ERP) systems is commonly assumed to be additions and modifications to ERP software and data tables provided by software vendors. The intent is to increase the fit between business processes and software, but customization “may affect the initial ERP implementation, as well as future maintenance, upgrade, and conversions” (Luo & Strong, 2004, pp. 323-324). According to a recent report, 12% of ERP implementations have no code customization, while 70% have 11-25% of the code modified (Panorama Consulting Solutions LLC, 2017). The report notes “extreme or complete” customization decreased by 6% from 2015 to 2016. However, ERP implementation remains challenging and costly since it involves major changes to ERP systems and business processes. Moreover, few extant studies address the relation between organizational change management (OCM) and customization, although the success of ERP implementation requires business process changes through OCM.

Given that “customizations can have substantial long-term cost implications” (Haines, 2009, p. 183), we are conducting a long-term study at a leading international auto systems manufacturer from the pre-implementation to post-implementation phases of a major ERP upgrade. Our research questions are twofold. First, how is OCM influencing ERP customization expectations? Second, how should firms manage ERP customization at global and local levels through OCM? At this (pre-implementation) stage, we can report the results of the first research question.

The structure of the paper is as follows. First, relevant literature is reviewed; next, the paper discusses the results of the qualitative study to provide contextual insight to customization and OCM; third, based on those results, hypothesized relations are proposed and assessed with the data from a survey questionnaire issued to ERP project managers; lastly, implications and the future research agenda are discussed.

2 Research Background

2.1 ERP systems and customization

ERP systems are standardized, integrated software solutions based on industrial “best practices” (Davenport, 1998; Jacobs & Weston Jr., 2007). However, ERP systems insert high technical and organizational complexity, such as requirements for technical configuration and customization, changes in business processes, new roles for employees, and extensive training for ERP users (Boudreau & Robey, 2005). ERP systems are designed in advance to fit many different organizations, and in many cases they cannot improve performance without having the organization change its business processes (Davenport, 1998; Engelstätter, 2012). Therefore, many organizations go through complex organizational changes, such as radical business process re-engineering (BPR), to increase user benefits, thereby realizing the potential of the new system (Luo & Strong, 2004).

ERP systems have predefined business rules and procedures that decide how business processes should operate. These embedded rules, however, will never completely align with the implementing organization (Hong & Kim, 2002; Soffer, Golany, & Dori, 2005). Alignment between organizations and ERP systems is an important goal for successful ERP implementation. In general, organizations may encounter problems because they do not understand the degree to which an enterprise system aligns with or corresponds to organizational needs (Rosemann, Vessey, & Weber, 2004). To reduce misfits, the ERP system is customized by completing various modifications, such as package code modification, adding new functionalities and applications, changing the interface and standard reports, or providing bolt-ons to integrate with other systems (Luo & Strong, 2004; Uppström, Lönn, Hoffsten, & Thorström, 2015). Luo and Strong (2004) further differentiate between process customizations and software customizations, and emphasize the importance of organizational capabilities for addressing misfits and for understanding the consequences of system customization.

2.2 Implication of ERP customization

Customizing the ERP system may lead to increased costs and complexities in future upgrades. Therefore, it is advised to minimize the degree of customization to avoid problems in the future (Brehm, Heinzl, & Markus, 2001; Davenport, 1998; Ross & Vitale, 2000; Somers & Nelson, 2004). Recent research demonstrates that a high degree of customization makes the ERP packages less efficient (Parthasarathy et al. 2016). However, customization is often required and executed (Brehm et al., 2001; Haines, 2009; Light, 2005), and has also proved to increase the overall organizational benefits in terms of business performance and productivity by generating more suitable functionalities for users (Chou & Chang, 2008). Moreover, studies indicate that factors outside misfits are at play; for example, resistance towards a new system may force changes in the ERP functionalities to increase user acceptance. Users do not want to change their routines and organizational culture, and put great pressure on the system development team to change the

system to keep old routines and controls (Light, 2005; Robey, Ross, & Boudreau, 2002; Volkoff, Strong, & Elmes, 2007). In addition, customization may indicate a lack of organizational change capabilities for adapting to new processes (Hong & Kim, 2002).

2.3 OCM and ERP implementation

OCM is a critical issue for all organizations operating in dynamic markets that require continuous transformation to stay competitive. Given customization is hard for cloud-based ERP systems (Al-Ghofaili & Al-Mashari, 2014), OCM is even more important whether ERP systems are on premise or cloud. Managing change is difficult and several approaches are discussed in previous literature; however, there is a call for more empirical research to better understand its critical factors (Todnem By, 2005) and how to implement change management in practice. Business process management (BPR) is an example of a change management approach, and ERP implementation projects that bring along requirements for BPR are referred to as either ERP-driven BPR implementations (Huq, Huq, & Cutright, 2006) or as a techchange approach (Markus, 2004). For new product development, an engineering change management (ECM) framework based on Configuration Management II (CMII) standards has been reported to have significant operational performance improvement (Wu, Fang, Lin, Yeh, & Ho, 2012; Wu, Fang, Wang, Yu, & Kao, 2014).

Several change management issues have been identified, such as leadership, barriers to change, inadequate communication, and organizational culture (Huq et al., 2006; Ngai, Law, & Wat, 2008). Dialog communication also is vital in coping with resistance to change (Matos Marques Simoes & Esposito, 2014). To create and communicate a vision for an OCM project is acknowledged as one of the most critical elements needed to succeed (Kotter, 2007). However, the way a vision is transferred and implemented in an organization is significant (Stapleton & Rezak, 2004). This is also supported in a study conducted by Naslund (2004), who highlights several organizational roadblocks as important for change management in ERP projects, such as the lack of shared vision, the lack of top management support, and the lack of commitment to change management. Several practical actions suggested to overcome these roadblocks include team organization, communication and knowledge transfer, training and education, and managing consultants.

Change management is needed to cope with user resistance and involves attempts to decrease user resistance by focusing on perceived value (Kim & Kankanhalli, 2009) or by determining the sources of user resistance to the ERP system (Aladwani, 2001). Several factors that lead to change management problems have been identified, such as failure to anticipate and plan for resistance, difficulty in gaining cross-functional cooperation, and failure to consider politics when implementing a change management approach (Grover, Jeong, Kettinger, & Teng, 1995). To overcome these issues, previous research recommends communicating the positive outcomes and benefits of ERP implementation by carrying out workshops and establishing locally customized training and education for end-users (Boudreau & Robey, 2005; Motwani, Subramanian, & Gopalakrishna, 2005).

In sum, OCM is one of the most cited critical success factors for ERP implementation, but there is still uncertainty regarding what change management tactics would work, meaning more in-depth research about this construct is needed (Finney & Corbett, 2007). Furthermore, there is a lack of studies focusing on OCM in relation to ERP customization, which is the focus of this study.

3 Qualitative Study

In major ERP upgrades, customization and OCM take place over continuous dynamic social interactions between the stakeholders of each business unit, including the IT unit, focused on upgrade objectives, budget, and other project resources. The adaptive structuration theory (DeSanctis & Poole, 1994) suggests that we observe customization and OCM in the context of such project evolutions. Thus, we undertook a case study first to develop a testable model.

3.1 Profile of Hanover Auto Systems

Headquartered in Northern Europe, Hanover, an alias, is one of the leading international manufacturers of automobile control systems. Currently, it manufactures products at 10 major locations around the globe with multiple instances of ERP. The management aims to standardize manufacturing and outbound logistics operations worldwide while upgrading its 10-year-old ERP with fewer instances of ERP. This requires major organizational changes in business processes and operations. The process of ERP upgrading has been protracted partly because of multiple take-over attempts and partly because of the scale of needed changes. We chose Hanover as an ideal research site since we can observe the ERP upgrade process with major OCM. Currently, the firm is a few months prior to the go-live of a new ERP at selected major locations.

3.2 Research Context and Method

During the pre-implementation phase, the main activities take place among the core project team, which consists of representatives from the IT units and key managers of select business units, along with a few ERP consultants. As a result, the number of empirical data points is relatively limited. For this reason, we used the action research approach that helps resolve practical problems while gaining scientific knowledge (Baskerville & Myers, 2004) through interviews with those managers.

Hanover's main business operations take place at the headquarters, as well as two main factories in the EU and one factory in North America. We selected one or two key managers in each location, and a lead ERP consultant to interview for the project. Each interview was 30-60 minutes long. Questions were asked in the three areas: (1) interviewees' work background and perceived status of the project, (2) customization needs, and the gap between needs and planned customizations, and (3) vision, organizational support, and perceived success of OCM. The interviews were recorded, and examined with descriptive and topic coding on (a) customization and (b) vision, support and issues with OCM.

3.3 Results

We extracted the interview accounts specifically addressing the current state and future expectations of OCM and customization. The highlights of interview results are threefold:

(1) OCM is harder than customization.

- “It’s easier to change the system [than change management].” (Logistics, Central Europe)
- “Our current [ERP] system is heavily customized.” (Forecast-to-Manufacturing, Eastern Europe)
- “In [the current ERP system], about one-third of ERP function was customized.” “[The current project] started with the wish list from [Hanover’s] departments.” “Change management is communication from early adopters to the rest.” (Consulting Lead, Northern Europe)
- “Change management is most needed for warehouse management in relation to production sites and distribution as well as hand-held device use.” (Operations, Northern Europe)
- “We discuss [the best practices of change management], but the discussions can go on forever (laugh).” “The strength of top management is needed not to allow local customizations.” (Forecast-to-Manufacturing, Central Europe)
- “The vision of the new system is communicated well? Probably not. Three years ago, an external company was handling communication. It is not present anymore.” “The project stalled with no communication for two years. The new CEO came in, and the project resumed in the mid-2015.” (Consulting Lead, Northern Europe)

(2) The main means of communication are face-to-face workshop meetings.

- “Tool for change management is lots of face-to-face meetings.” “[A challenge for the change management is that] each person listens and understands correctly. The vocabulary or business terms are not the same across the globe.” (Logistics, Central Europe)
- “The key aspects of training are hands-on training and face-to-face meetings.” “[The big challenge is] discussing issues with many people around the globe.” (Operations, Northern Europe)
- “I attend a-week-long workshop every month for this ERP upgrade project.” (Manufacturing Forecast, Eastern Europe)

(3) Beyond workshops, the vision for the ERP project is not well communicated globally.

- “[Top 3 challenges are] ... to set the common processes globally ... lack of the knowledge on the details of [the new system] ... [and] lack of guidance from the top management.” (Forecast-to-Manufacturing, Central Europe)
- “I am not fully aware of detailed rollout plans. ... I have not been exposed to [the new system] in detail.” “I think it’s important to give users “real” information on [the new system]. That is, they see how [the new system] operates in their work.” (Global Supply Chain, North America)

For customization, the biggest issue is lack of information on the details of the new ERP system. The interviewees are at least aware that electronic data interchange (EDI) functions require substantial customization. Some of them also noted lack of information applies to the current ERP systems.

- “Customization is mainly concentrated in the area of EDI. ... The other (non-EDI related) areas require customization 80% less than the [last] project.” (Operations, Northern Europe)
- “EDI, for example, 100% customization.” “Developers [did not] document [customization] well.” “The third party did it. I do not know the details [of customization work].” (Forecast-to-Manufacturing, Eastern Europe)

One interviewee expressed her concerns that global standardization would likely make her area of operations worse than it is now, while other areas of operations in Hanover might improve. Her remark underscores the contention between global and local benefits. It may also reflect a lack of clarity in OCM vision.

- “Up till now, the North American plants have been using a ‘lean’ manufacturing approach with a 3-day window. With the globally standardized manufacturing process, [Hanover] is looking at a 10-day window for less ‘lean.’” (Global Supply Chain, North America)

It is worth noting that Hanover Auto Systems has gone through several takeover attempts. Such attempts have made it difficult for middle management to commit to the new ERP implementation. In addition, the top management faces major uncertainties when providing guidance for OCM. Persistent tension exists between headquarters and the business units regarding the customizations that benefit the firm as a whole, and the compromises requested from some local business units. As such, from the perspective of local managers, customization appears inseparable from local benefits and OCM.

3.4 Refinement of Research Model

The above results point to the customization challenges in OCM especially associated with Hanover’s global supply chain management (SCM). In addition, the results demonstrate the importance of assuring data quality concerning SCM logistics managed through EDI and data warehouses. Towards the post-implementation phase, the interview results prompt us to assess the following three issues: i) To what extent do the project team members perceive the vision and organizational support as problems? ii) How do these factors lead to perceived OCM problems? iii) How do perceived OCM problems relate to the degree of customization expectations? The next section addresses these questions with a quantitative approach.

4 Quantitative Assessment of the qualitative study

In the pre-go-live stage, it is critical to manage end-user expectations on OCM, customization, and ERP implementation outcomes. The qualitative study revealed the intricate relations between those expectations. This section proposes a research model to further assess their relations.

4.1 Development of hypotheses

In this section, we develop our hypotheses focusing on the relations between ERP customization and OCM. The hypotheses are based on existing literature and the conducted pre-study, which was comprised of qualitative interviews.

Organizations often struggle to find the right balance between ERP customization and changes in business processes (Haines, 2009). Changing organizational processes requires user commitment; thus, implementation of an OCM strategy in parallel with the ERP project has proved important (Markus, 2004). A vision for OCM must be developed and institutionalized in the organization before implementing the system to obtain realistic user expectations. A vision that is communicated and well-known in the organization will earn commitment from the employees and develop an overall organizational support that could reduce user resistance (Kim & Kankanhalli, 2009). This will create an organizational climate that is prepared for changes. This leads to the first hypothesis:

H1: Organizational support for change management decreases OCM problems.

When users are prepared for a new system and the benefits of the system are well communicated through an OCM approach, users will develop high benefit expectations for the system. However, in an international company with several locations, the ERP implementation should align with different cultures (Krumbholz, Galliers, Coulianos, & Maiden, 2000; Soh, Kien, & Tay-Yap, 2000), and local/global relationship needs to be considered (Gattiker & Goodhue, 2005; Markus, Tanis, & Van Fenema, 2000). We predict the following relationship:

H2: Organizational support for change management increases local benefit expectations.

When there is a problem creating an OCM vision, or when this vision is missing, an organization is unprepared for changes, which leads to problems executing OCM actions (Kotter, 2007; Stapleton & Rezak, 2004). Therefore, establishing a vision is the first step before activating an OCM strategy. This leads to the following hypothesis:

H3: Problems with an OCM vision increase OCM problems in general.

One of the benefits of ERP systems is increased information/data quality because ERP systems often lead to the out-phasing of several functional or legacy systems that have caused data redundancy before the ERP implementation. According to Gattiker and Goodhue (2005), ERP systems provide access to corporate-wide data; however, data can still be inaccurate or irrelevant for idiosyncratic business processes at a local level (e.g., at different sub-units). ERP systems provide the promise of real-time data; however, this requires continuous system updates by the users. However, this is not always the case, because users are not always aware of the needs at other locations, and input to the system can be either delayed or not registered, leading to inaccurate data (Allen, 2005). If users do not get the data they need it is likely that expectations for customization will increase. Based on this, we predict the following:

H4: Expectations for data quality increases expectations for customization.

Resistance to change is a key reason for customization (Zach & Munkvold, 2012). However, end-users have little to resist when they are not aware of the details of the new system. Findings from the interviews indicate that change management was difficult to implement and that vision was not well implemented and

understood. The ERP systems were heavily customized in some sub-units and less customized in others. However, the perception was that it was easier to customize the system than it was to implement change management. Problems with the change management approach will lead to efforts to deal with resistance and cultural problems, and will likely take the focus away from customization. Thus, we postulate the following:

H5: OCM problems decrease expectations for customization.

Gattiker and Goodhue (2005) suggest that inter-dependencies among sub-units within an organization provide a better fit for the ERP globally; however, the differentiation among sub-units provides misfits of the ERP at the local level with local business needs. Moreover, customization of the ERP system will moderate the negative effects of differentiation between sub-units with respect to coordination and task efficiency. Therefore, requirements and implementation of ERP customization actions are likely to increase the expectations for gaining benefits at the local level/sub-unit level. This was also supported by the preliminary findings from the interviews as some locations had executed comprehensive customizations on the ERP system. This leads to the final hypothesis:

H6: Expectations for customization increase expectations for local benefits.

Our research model with the hypotheses is shown in Figure 1 below.

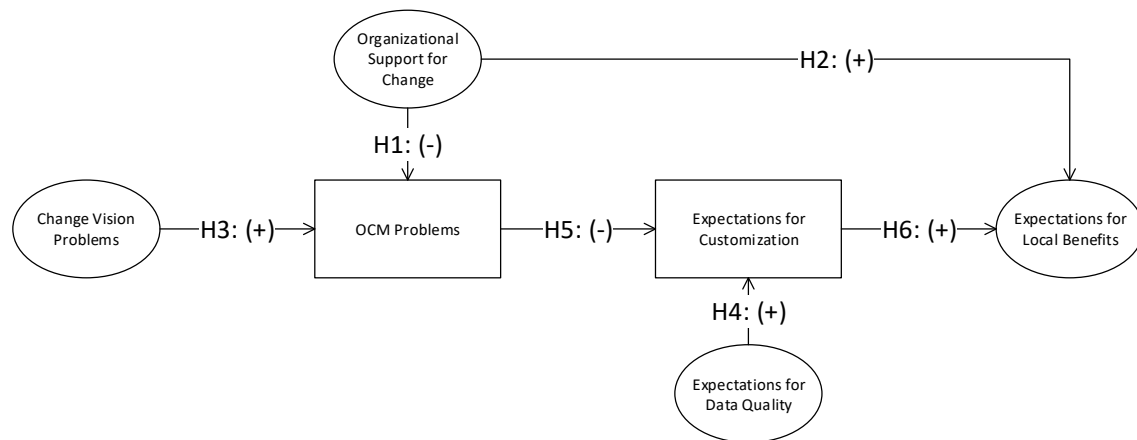


Figure 1. Research model with hypothesized variable relations

4.2 Variables and survey questionnaire

Kim and Kankanhalli (2009)'s organizational support for change (3 items) measured *Organizational Support for Change* ("Hanover provides me guidance on how to change to the new way of working with [the new ERP system]," "The Hanover management provides the necessary help and resources to enable me to change to the new way of working with the new ERP system," and "I am given the necessary support and assistance to change to the new way of working with [the new ERP system] by Hanover."). *Change Vision Problems* is a newly developed construct with the following 4 items: "The vision for the new ERP system is well known at my location," "Communication of the vision for the new ERP system at my location is problematic," "Communication of the sense of urgency for the new ERP system at my location is problematic," and "The fit between the new ERP system and the Hanover vision is problematic." *OCM Problems* were assessed with 2 items ("Senior management's failure to commit to new values is problematic,"

and “Failure to communicate reasons for change to members at my location is problematic”) from change-management problems (Grover et al., 1995). *Expectations for customization* were measured with 2 items (“When [the new ERP system] is implemented, the package is changed to better meet the needs of this business unit/plant,” and “The new ERP system is going to improve its fit with this business unit/plant.”) adapted from “ERP Customization to Meet Local Plant Needs”(Gattiker & Goodhue, 2005).

For *Expectations for Local Benefits*, the study used 2 items (“In terms of its business impacts on this business unit/plant, the new ERP system will be a success,” and “The new ERP system will seriously improve this business unit/plant’s overall business performance.”) based on “Overall Business Impact of ERP on the Plant” of Gattiker and Goodhue (2005)’s ERP Customization. *Data Quality* (Gattiker & Goodhue, 2005) was assessed with 3 items (“The information that [the new ERP system] provides to employees in this location will be accurate,” “The data we receive from [the new ERP system] will be true,” and “[The new ERP system] data that employees (planners, supervisors, etc.) use or would like to use at this location will be accurate enough for their purposes.”). All items were measured using a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree).

4.3 Respondent profiles

The respondents were the core project members; they were all managers. Of 45 managers contacted, 33 managers participated in the survey questionnaire (a 73.3% response rate). Their responses broadly represent the viewpoints of key operational units in diverse geographic regions.

Country	Frequency	Percentage
Central Europe	6	18%
Mexico	5	15%
Northern Europe	14	42%
USA	8	24%
Total	33	100%

Area	Frequency	Percentage
Manufacturing	11	33%
IT	5	15%
Sales & service	5	15%
Logistics	11	33%
Accounting	1	3%
Total	33	100%

Table 1. Respondent profiles

4.4 Construct validation and variable relationships

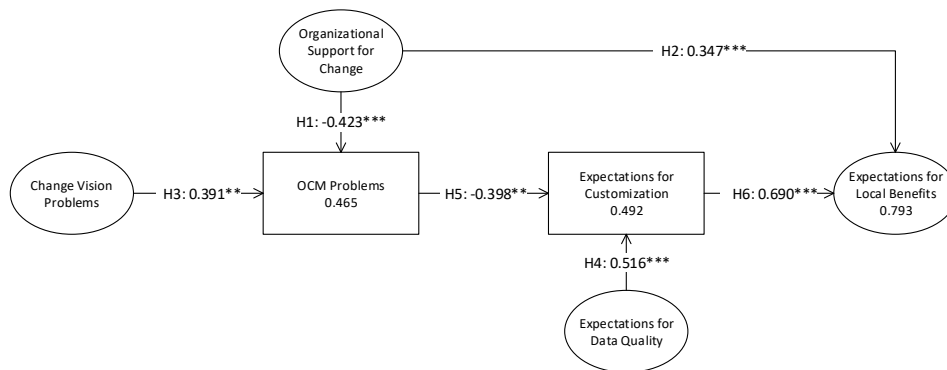
A partial least squares (PLS) model was chosen given that multiple paths exist between variables. Our sample size may meet the so-called “5-times” rule (Falk & Miller, 1992), however the results should certainly be taken with caution (Goodhue, Lewis, & Thompson, 2012). This study used SmartPLS 3.0 (Ringle, Wende, & Becker, 2015) to validate variable constructs and to test the research model. We followed the reporting convention used in the previous studies (Peng & Lai, 2012; Wong, 1994). The loadings of latent variables were all significant. Table 2 gives the latent variables’ Cronbach alphas and the results of convergent and discriminant validity tests; in addition, its diagonal shows the square root of average variance extracted (AVE) values. The maximum VIF was 3.249, which is below the suggested cutoff value of 5 (Hair, Ringle, & Sarstedt, 2011).

	Alpha	Comp R	CMP	VSN	CST	DQ	LBE	OSC
Change Mgmt Problems (CMP)	0.814	0.886	0.850					
Change Mgmt Vision Problems (VSN)	0.771	0.892	0.562	0.898				
Customization (CST)	0.809	0.913	-0.482	-0.331	0.916			
Data Quality (DQ)	0.842	0.904	-0.164	-0.440	0.581	0.872		
Local Benefit Expectations (LBE)	0.727	0.880	-0.548	-0.453	0.832	0.508	0.886	
Org Support for Change (OSC)	0.889	0.931	-0.581	-0.404	0.409	0.243	0.630	0.905

Table 2. Cronbach’s α , composite reliability, and correlations of latent variables

4.5 Results of hypothesis tests

Figure 2 shows the results of the PLS model. *Organizational Support for Change* decreases *OCM problems* ($\beta=-0.423$; $p=0.002$) while increasing *Expectations for Local Benefits* ($\beta=0.347$; $p=0.001$), supporting H1 and H2. *Change Vision Problems* increases *OCM Problems* ($\beta=0.391$; $p=0.014$), which decreases *Expectations for Customization* ($\beta=-0.398$; $p=0.034$). This affirms H3 and H5. *Expectations for Data Quality* increase *Expectations for Customization* ($\beta=0.516$; $p=0.002$), which in turn increases *Expectations for Local Benefits* ($\beta=-0.690$; $p=0.000$). H4 and H6 were thus supported.



** $p < 0.05$, *** $p < 0.01$

Figure 2. Results of PLS model

5 Implications

There are several major implications of this study. First, the qualitative study highlights the degree of uncertainly stakeholders’ feel during the OCM process prior to the go-live moment. This is apparent given that all the team members we interviewed emphasized the criticality of communication in different ways. For example, they crave “real” information, as found in the global supply chain manager’s statements. Their key method of change management is face-to-face communication in workshops, given that face-to-face conversation enables “a remarkably orderly process” of communication with paraverbal and non-verbal cues (Warkentin & Beranek, 1999). Second, team members seek a vision for change or “guidance from the top management,” as the logistics manager indicated. In the pre-implementation phase, an ERP case study

by Hustad and Olsen (2014) notes that general employees tend to feel the project team is unaware of their work duties. Thus, it would not be surprising if the project team feels “stuck in the middle” between top management and end-users. In this regard, the communication of an OCM vision with strong leadership would be vital especially for large-scale ERP upgrades. The expectations of customization are partly a form of end-user resistance to change (Usman, Soomro, & Brohi, 2014), especially when the goal of OCM is geared towards global benefits and is not necessarily driven by the wishes of local managers.

The assessment of our quantitative research model provided additional insights into the above implications. In Figure 2, the averages of the latent variables are generally higher for organizational support and data quality expectations than vision problems and change management problems. Thus, local managers understand OCM to be something that should increase local benefits. To local managers, this means more customization than headquarters wishes. In addition, support for OCM seems to mean listening to local wishes, which necessitates more customization than top management desires. Regarding expectations for local benefits, the expectations for customization ($\beta=0.690$) is approximately twice as influential as organizational support for change ($\beta=0.347$). Another detail of the quantitative assessment is that OCM is driven by vision and organizational support. If the vision is weak or not communicated clearly, organizations have more OCM problems than they would otherwise. Lastly, customization is strongly driven by the expectations of quality data ($\beta=0.516$).

For project managers, our results mean that management of local benefit expectations is crucial. Local users strongly associate their benefits with customization. Project managers also need to demonstrate that the data quality of a new ERP system is not as bad as, or is even better than, local users might think. For researchers, the current results confirm the strong association between customization and OCM. In our research model, fewer OCM problems lead to more customization expectations. This implies that the content of an OCM vision might be crucial to minimizing customization without increasing customization expectations.

6 Conclusion, Limitations, and Future Research Agenda

This paper reports the pre-implementation phase results of a longitudinal case study at a leading international automobile systems manufacturer: Hanover Auto Systems. ERP customization expectations in the pre-go-live stage are influenced by data quality expectations, but are modulated by OCM problems. Local users inherently believe that local benefits are associated with more customization. Lack of OCM vision and support causes OCM problems. This lowers the expectations for customization, because users become unaware of the details of the new ERP systems.

We plan to collect follow-up data once the new ERP system goes live. However, the study is relying on data collected from one firm. To remedy this limitation, we plan to administer a survey questionnaire to managers at multiple firms implementing a major ERP upgrade or new installation.

References

- Al-Ghofaili, A. A., & Al-Mashari, M. A. (2014). *ERP system adoption traditional ERP systems vs. cloud-based ERP systems*. Paper presented at the 2014 Fourth International Conference on Innovative Computing Technology (INTECH), Luton, UK.
- Aladwani, A. M. (2001). Change management strategies for successful ERP implementation. *Business Process Management Journal*, 7(3), 266-275. doi: 10.1108/14637150110392764
- Allen, J. P. (2005). Value conflicts in enterprise systems. *Information Technology & People*, 18(1), 33-49.
- Baskerville, R., & Myers, M. D. (2004). Special issue on action research in information systems: Making IS research relevant to practice: Foreword. *MIS Quarterly*, 28(3), 329-335.
- Boudreau, M.-C., & Robey, D. (2005). Enacting Integrated Information Technology: A Human Agency Perspective. *Organization Science*, 16(1), 3-18. doi: 10.1287/orsc.1040.0103

- Brehm, L., Heinzl, A., & Markus, M. L. (2001). *Tailoring ERP systems: a spectrum of choices and their implications*. Paper presented at the System Sciences, 2001. Proceedings of the 34th Annual Hawaii International Conference on.
- Chou, S.-W., & Chang, Y.-C. (2008). The implementation factors that influence the ERP (enterprise resource planning) benefits. *Decision Support Systems*, 46(1), 149-157.
- Davenport, T. H. (1998). Putting the Enterprise into the Enterprise System. *Harvard Business Review*, 76(4), 121-131.
- DeSanctis, G., & Poole, M. S. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organizational Science*, 5(2), 121-147.
- Engelstätter, B. (2012). It is not all about performance gains – enterprise software and innovations. *Economics of Innovation and New Technology*, 21(3), 223-245. doi: 10.1080/10438599.2011.562359
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. Akron, OH: University of Akron Press.
- Finney, S., & Corbett, M. (2007). ERP implementation : a compilation and analysis of critical success factors. *Business Process Management Journal*, 13(3), 329-347.
- Gattiker, T. F., & Goodhue, D. L. (2005). What happens after ERP implementation: understanding the impact of interdependence and differentiation on plant-level outcomes. *MIS Quarterly*, 29(3), 559-585.
- Goodhue, D. L., Lewis, W., & Thompson, R. (2012). Does PLS have advantages for small sample size or non-normal data? *MIS Quarterly*, 36(3), 891-1001.
- Grover, V., Jeong, S. R., Kettinger, W. J., & Teng, J. T. C. (1995). The Implementation of Business Process Reengineering. *Journal of Management Information Systems*, 12(1), 109-144. doi: 10.1080/07421222.1995.11518072
- Haines, M. N. (2009). Understanding enterprise system customization: An exploration of implementation realities and the key influence factors. *Information Systems Management*, 26(2), 182-198.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152.
- Hong, K.-K., & Kim, Y.-G. (2002). The critical success factors for ERP implementation: an organizational fit perspective. *Information & Management*, 40(1), 25-40. doi: 10.1016/s0378-7206(01)00134-3
- Huq, Z., Huq, F., & Cutright, K. (2006). BPR through ERP: Avoiding change management pitfalls. *Journal of Change Management*, 6(1), 67-85. doi: 10.1080/14697010500523442
- Hustad, E., & Olsen, D. H. (2014). ERP Implementation in an SME: A Failure Case. In J. Devos, H. van Landeghem & D. Deschoolmeester (Eds.), *Information Systems for Small and Medium-sized Enterprises: State of Art of IS Research in SMEs* (pp. 213-228). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Jacobs, R. F., & Weston Jr., T. F. C. (2007). Enterprise resource planning (ERP)--A brief history. *Journal of Operations Management*, 25(2), 357-363.
- Kim, H.-W., & Kankanhalli, A. (2009). Investigating user resistance to Information Systems implementation: A status quo bias perspective. *MIS Quarterly*, 33(3), 567-582.
- Kotter, J. P. (2007). Leading Change: Why Transformation Efforts Fail. *Harvard Business Review*, 85(1), 96-103.
- Krumbholz, M., Galliers, J., Coulianos, N., & Maiden, N. A. M. (2000). Implementing enterprise resource planning packages in different corporate and national cultures. *Journal of Information Technology (Routledge, Ltd.)*, 15(4), 267-279.
- Light, B. (2005). Going beyond 'misfit' as a reason for ERP package customisation. *Computers in Industry*, 56(6), 606-619.
- Luo, W., & Strong, D. M. (2004). A Framework for Evaluating ERP Implementation Choices. *IEEE Transactions on Engineering Management*, 51(3), 322-333.

- Markus, M. L. (2004). Technochange management: using IT to drive organizational change. *Journal of Information Technology*, 19(1), 4-20.
- Markus, M. L., Tanis, C., & Van Fenema, P. C. (2000). Enterprise resource planning: multisite ERP implementations. *Communications of the ACM*, 43(4), 42-46.
- Matos Marques Simoes, P., & Esposito, M. (2014). Improving change management: How communication nature influences resistance to change. *Journal of Management Development*, 33(4), 324-341.
- Motwani, J., Subramanian, R., & Gopalakrishna, P. (2005). Critical factors for successful ERP implementation: Exploratory findings from four case studies. *Computers in Industry*, 56(6), 529-544. doi: <http://dx.doi.org/10.1016/j.compind.2005.02.005>
- Naslund, D. (2004). The Importance of Culture and Change Management in Planning for an ERP Implementation. *Supply Chain Forum: An International Journal*, 5(1), 24-36. doi: 10.1080/16258312.2004.11517124
- Ngai, E. W. T., Law, C. C. H., & Wat, F. K. T. (2008). Examining the critical success factors in the adoption of enterprise resource planning. *Computers in Industry*, 59(6), 548-564.
- Panorama Consulting Solutions LLC. (2017). 2017 Report on ERP Systems and Enterprise Software.
- Peng, D. X., & Lai, F. (2012). Using partial least squares in operations management research: A practical guideline and summary of past research. *Journal of Operations Management*, 30(6), 467-480.
- Ringle, C. M., Wende, S., & Becker, J.-M. (2015). SmartPLS 3. *Boenningstedt: SmartPLS GmbH*, <http://www.smartpls.com>.
- Robey, D., Ross, J. W., & Boudreau, M.-C. (2002). Learning to Implement Enterprise Systems: An Exploratory Study of the Dialectics of Change. *Journal of Management Information Systems*, 19(1), 17-46.
- Rosemann, M., Vessey, I., & Weber, R. (2004). Alignment in enterprise systems implementations: the role of ontological distance. *ICIS 2004 Proceedings*, 35.
- Ross, J. W., & Vitale, M. R. (2000). The ERP Revolution: Surviving vs. Thriving. *Information Systems Frontiers*, 2(2), 233-241.
- Soffer, P., Golany, B., & Dori, D. (2005). Aligning an ERP system with enterprise requirements: An object-process based approach. *Computers in Industry*, 56(6), 639-662.
- Soh, C., Kien, S. S., & Tay-Yap, J. (2000). Enterprise resource planning: cultural fits and misfits: is ERP a universal solution? *Communications of the ACM*, 43(4), 47-51.
- Somers, T. M., & Nelson, K. G. (2004). A taxonomy of players and activities across the ERP project life cycle. *Information & Management*, 41(3), 257-278.
- Stapleton, G., & Rezak, C. J. (2004). Change management underpins a successful ERP implementation at Marathon Oil. *Journal of Organizational Excellence*, 23(4), 15-22. doi: 10.1002/npr.20022
- Todnem By, R. (2005). Organisational change management: A critical review. *Journal of Change Management*, 5(4), 369-380.
- Uppström, E., Lönn, C.-M., Hoffsten, M., & Thorström, J. (2015). *New Implications for Customization of ERP Systems*. Paper presented at the 2015 48th Hawaii International Conference on System Sciences (HICSS).
- Usman, M., Soomro, T. R., & Brohi, M. N. (2014). Embedding project management into XP, SCRUM and RUP. *European Scientific Journal*, 10(15), 293-307.
- Volkoff, O., Strong, D. M., & Elmes, M. B. (2007). Technological Embeddedness and Organizational Change. *Organization Science*, 18(5), 832-848.
- Warkentin, M., & Beranek, P. M. (1999). Training to improve virtual team communication. *Information Systems Journal*, 9(4), 271-289.
- Wong, S. T. C. (1994). Preference-based decision making for cooperative knowledge-based systems. *ACM Transactions on Information Systems (TOIS)*, 12(4), 407-435.

- Wu, W.-H., Fang, L.-C., Lin, T.-H., Yeh, S.-C., & Ho, C.-F. (2012). A novel CMII-based engineering change management framework: an example in Taiwan's motorcycle industry. *IEEE Transactions on Engineering Management*, 59(3), 494-505.
- Wu, W.-H., Fang, L.-C., Wang, W.-Y., Yu, M.-C., & Kao, H.-Y. (2014). An advanced CMII-based engineering change management framework: the integration of PLM and ERP perspectives. *International Journal of Production Research*, 52(20), 6092-6109.
- Zach, O., & Munkvold, B. E. (2012). Identifying reasons for ERP system customization in SMEs: a multiple case study. *Journal of Enterprise Information Management*, 25(5), 462-478.