

Effective Strategies to Overcome Challenges in ERP Projects: Perspectives from a Canadian Exploratory Study

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Received: May 20, 2019

Accepted: June 3, 2019

Online Published: June 18, 2019

doi:10.5539/ibr.v12n7p12

URL: <https://doi.org/10.5539/ibr.v12n7p12>

Abstract

This qualitative exploratory case study explores strategies and mitigating actions for successful Enterprise Resource Planning (ERP) implementations. The research was conducted in a Canadian case organization in the oil and gas industry, using a semi-structured interview guide with a total of twenty interviews that includes members from four project role groups of senior leaders, project managers, project team members, and business users. For triangulation purposes, the study used interview responses and also ERP project documentation collected for the purpose. The research highlighted several strategies and mitigating actions that can be put in use by organizations. The key themes that emerged as effective strategies include having the right people for support and guidance from experts, change management, clear communications, hands-on training, lots of testing, and risk management. The study also provided evidence that adopting strategies can help overcome critical challenges during ERP implementations.

Keywords: Enterprise Resource Planning (ERP), implementation, exploratory study, strategies, mitigating actions, critical challenges, Canada, oil and gas industry

1. Introduction

It is commonly acknowledged that information technology is capable of fundamentally changing the way business works; many organizations in particular have used the advanced information technology solution of Enterprise Resource and Planning (ERP) systems to improve their competitiveness (Davenport, 1998; Erkan & Rouyendegh, 2011). Despite lengthy time frames and high costs, ERP projects most often do not perform according to business expectations (Davenport, 1998; Ehie & Madsen, 2005; Momoh, Roy, & Shehab, 2010; Stanciu & Tinca, 2013). There is also a lack of understanding on addressing critical challenges during implementation, which can lead to large cost overruns, cancellations, and project failures (Momoh et al., 2010; Stanciu & Tinca, 2013). This qualitative, exploratory single-case study in the Canadian energy industry, is an examination of the strategies and mitigating actions that organizations can adopt during ERP implementation.

2. Foundational Studies

This study reviewed some of the foundational studies by Davenport (1998); Somers & Nelson (2001); Finney & Corbett (2007); Mishra & Mishra (2011); and Stanciu & Tinca (2013). Davenport's seminal article, though not first in the field of ERP study had a great impact, which highlighted some of the initial failure stories in ERP. Davenport (1998) emphasized that ERP systems can produce rewards, but there are risks involved, and that the managers should avoid being blinded by the hazards. Davenport (1998) argued that in petrochemical industry, which related to the current study, installation of ERP systems improved information flow through the supply chain, making it an industry standard. The empirical study from Somers and Nelson (2001) highlighted critical issues affecting the ERP implementation process and the need to effectively address them. Somers and Nelson (2001), identified some of the critical success factors (CSFs) that include top management support, the need for a project champion, user training, project planning, technological competence, change management, and project management. Addressing the success factors can improve the success of the project.

Finney and Corbett (2007) structured methodological approach identified twenty-two critical success factors grouped into strategic and tactical factor categories. Strategic factors are doable elements that address the larger picture, whereas tactical factors correspond to skillful methods. Implementation strategy and timeframe, top

management commitment and support, visioning and planning, project champions, building a test case, vanilla ERP, project management, change management, are some of the strategic critical factors (Finney & Corbett, 2007). The key tactical strategic factors are selection of ERP, communication plan, balanced team, a project team composed of brightest and the best, team morale and motivation, project cost planning and management, legacy system considerations, client consultation, data conversion, testing, and training (Holland & Light, 1999; Finney & Corbett, 2007). Finny and Corbett further argued that “all of the ERP success factors are important in their own right; however, the need to approach the implementation from a change management perspective is central to the success of any ERP project” (2007, p. 344).

Mishra and Mishra (2011) highlighted some of the specific ERP implementation challenges in the oil and gas sector. Mishra and Mishra (2011) pointed out that ERP implementations saw great improvement in areas such as maintenance, financial, and procurement; whereas some other areas, such as like employee records, contract administration, and integrated planning remained weak. Mishra and Mishra (2011) argued that ERP systems will bring in personnel and process changes, including job reductions and responsibility rationalizations. Stanciu and Tinca (2013) empirical study explored two ERP implementation projects, highlighting significant factors that determined project success and failure. In the context of ERP, Stanciu and Tinca (2013) noted ultimate user satisfaction, ERP project team and service, ERP product, user knowledge and involvement, and the continuous commitment to change and processes in the ERP system as the significant factors for ERP project success (Florescu, Ionescu, & Tudor, 2010). According to Stanciu and Tinca, “management commitment, project opposition, corporate culture, planning and change management, users’ training, [and] rollout strategy” (2013, p.630) are the main factors contributing to ERP success. In summary, identifying and mitigating potential risks or challenges must be undertaken throughout the project and can be done by drawing a road map and performing an adequate risk management process. Learning from past mistakes and using experience gained from previous projects will help the practitioners, as well as the organization, to avoid similar errors, thereby increasing ERP success (Stanciu & Tinca, 2013). The importance of strategies that must be adopted as early as the start of the project is therefore critical for a successful ERP implementation.

3. Methodology

The research study used a qualitative exploratory single-case study design in order to understand the perceptions of each of the four project role groups with respect to strategies and mitigating actions in ERP implementations. Exploratory case study research is used to investigate a phenomenon by understanding perceptions and is usually focused on a small sample population for arriving at in-depth and rich data (Hewlett, 2005; Yin, 2014). Qualitative exploratory case studies typically involve small heterogeneous samples that can offer in-depth investigation, and such a case study is considered an appropriate tool for undertaking research in ERP implementation (Yin, 2009; Mishra & Mishra, 2011). Important characteristics applicable to exploratory case study research were aligned with this study’s objectives. These were enabling deep focus on scope, instead of a broad focus, generating hypotheses rather than testing them, and exploring a heterogeneous population instead of a homogeneous one (Gerring, 2007). The study design was also conducive to identifying rich insights into the identified role groups’ perceptions and differences (Woodside, 2010). This exploratory case study research also involved in collecting documentation, archived records, or both (Denzin, 2012; Howe, 2012; Nickson, 2014).

The case setting used for the current study is a Canadian oil and gas company involved in ERP implementation. Three oil companies in Canada were identified as having integrated refining capabilities such as upstream, downstream, and retail business capabilities. All three organizations had significant staff size and ERP implementation project history. For general guidance toward site selection for a qualitative case study exploring ERP in the oil and gas industry, examples were drawn from the literature (Mishra & Mishra, 2011). One of the three suitable Canadian oil and gas companies agreed to participate in the study. The inclusion criteria required that the participants must have experience in ERP project roles. The participants also must have worked in ERP implementation projects in the Canadian oil and gas industry. The organization assisted in soliciting employee participation; however, participants were selected based on inclusion criteria and on a first-response basis.

4. Data Collection

Stratified sampling was used due to the small sample size and the desire to obtain data from each stratum or participant group of the sample (Gerring, 2007). Twenty participants were selected for this study using stratified purposive sampling from the chosen Canadian oil and gas company. The sample represents four participant project team roles that consisted of three senior leaders, four project managers, six project team members, and seven business users, for a total of 20 subjects. Characteristics that were noted but not used as selection criteria included project-team member age level, overall employment experience, and educational level. McLeod (2010)

suggested that case-study research advocates for participants be knowledgeable about the phenomenon in its context, which was a requirement for participant inclusion in this study. The inclusion criteria required that the participants must have experience in ERP project roles and also must have worked in ERP implementation projects in the Canadian oil and gas industry. The organization assisted in soliciting employee participation; however, participants were selected based on inclusion criteria and on a first-response basis.

The draft interview guide was composed of interview questions and compiled based on research questions for the current study. The research was field-tested using SMEs and role-players. To lessen interviewer bias, all questions were asked in the same order (Gubrium & Holstein, 2001). All the interviews were held in a safe public place and was recorded using two digital audio recorders. Among interview questions researcher asked the participants about: “what strategies and mitigating actions are used to overcome barriers or challenges during ERP implementation”? In this study document review facilitated data triangulation, which provided another source of data beyond the semi-structured interviews with senior leaders, project managers, project team members, and business users (Yin, 2009; Denzin, 2012; Howe, 2012; Nickson, 2014).

5. Data Analysis

The researcher conducted a total of 20 face-to-face interviews with participants from the four project team role groups: senior leaders, project managers, project team members, business users. The researcher’s step-by-step analysis are detailed in the following numbered list:

1. The researcher recorded the in-person interviews and took notes;
2. The researcher transcribed the audio files, and organized the notes for data entry;
3. The researcher entered the collected data into NVivo software for data coding and analysis;
4. The researcher triangulated multiple data sources to address interview data among four groups as well as between interview data and documents collected (Jonsen & Jehn, 2009);
5. The researcher prepared charts and graphs with NVivo software and Microsoft Excel to illustrate the data results; and
6. The researcher conducted data analysis.

Qualitative data analysis software NVivo 11, by QSR International (2016), was used to organize, tabulate, and code the interview responses. The identified themes and findings were loaded into NVivo for qualitative data analysis using the following steps.

1. Read transcripts and field observations; read documentation by site sponsor;
2. Apply tools for evaluation, enter data information; Evaluate and triangulate data.

The data analysis process described above was also used for document analysis. Document review facilitated data triangulation such that it provided another source of data (Denzin, 2012; Jonsen & Jehn, 2009; Yin, 2009). The triangulation helped with understanding perceptions of the four participant team role groups based on this study’s research questions (Vogt, Gardner, & Haeffele, 2012).

6. Discussion of Results

Research findings from the interview responses from the four ERP project role groups are discussed below according to the relevance of strategies and mitigating actions for ERP implementations. Research showed 29 strategies (see Appendix A) to overcome the critical challenges during ERP implementation (Menon, 2016; Menon, Muchnick, Bulter & Pizur, 2019). Based on highest frequency count, six themes were identified as the strategies that can be used to overcome critical challenges as detailed in Table 1. The key themes that emerged as strategies include having the right people for support and guidance from experts, change management, clear communications, hands-on training, lots of testing, and risk management. However, one project manager and two project team members were unfavorable, stating that they didn’t see any strategies being used. Response also identified four mitigating actions as outlined in Table 2. Similarly, one of the senior leaders argued that no real mitigation was in place to overcome challenges.

Table 1. Strategies to Overcome the Critical Challenges as Reported by Members of the Project Role Groups

Strategies: Top Themes	Senior Leader	Project Manager	Project Team Member	Business User
Having the right people for support and guidance from experts	1	–	4	4
Change management	2	1	1	1
Clear communications	–	–	1	2
Hands-on training	1	1	–	1
Lots of testing	–	–	1	2
Risk management	–	1	2	–
Didn't see any strategies used	–	1	2	–
Total	4	4	11	10

Note. The table highlights top six strategies that can help overcome critical challenges during ERP implementation. This is based on high-frequency count across all four project role groups. A dash indicates that no member of the group reported that strategy for overcoming critical challenges.

Table 2. Mitigating Actions as Reported by Members of the Project Role Groups

Mitigating Actions	Senior Leader	Project Manager	Project Team Member	Business User
Manual interventions	–	–	1	1
Reduce stress of people by recognition, time off	–	–	–	1
Making personal calls to customers	–	–	–	1
Blocking wrong customer accounts	–	–	–	1
There is not a lot of mitigation in place	1	–	–	–
Total	1	–	1	4

Note. The table highlights the mitigating actions used by the case organization for overcoming critical challenges during ERP implementation. This is based on high-frequency count across all four project role groups. A dash indicates that no member of the group reported that mitigating action.

Senior leader role response highlights. Participant SL1 indicated that the main strategies used (Appendix A) were temporary reporting measures, focusing on top-ten list accounts, properly operating disputes systems, transferring lessons learned from large accounts to all other accounts, implementing changes to eliminate root causes, and finally addressing problems according to lines of business by setting up multi-function groups. According to SL2, project leadership strategy was to deliver on time and on budget, with little flexibility and no real mitigation in place. Participant SL3 listed change and engage strategy, well-defined and rigorously applied project methodology, implementation methodology, resourcing project teams, and deploying project team members back to business as some of the strategies effectively used during implementation. SL3 stressed the importance of change and engage:

Um, yeah, so there was a huge change and engage strategy that's probably, yeah, probably one of the most noteworthy strategies, which was quite comprehensive, and it was really intended to help overcome a number of the barriers I alluded to, right.

Project manager role response highlights. Participant PM1 highlighted the main strategies as risk management, changing leadership during the process, and strict change control. Also, PM1 noted a very good strategy to capture a particular business but added "we weren't so good at the integrated strategies [across the organization]." Participant PM2 indicated that the downstream strategy was well put-together, with different teams responsible for different tasks and different stage gates to ensure that every team met the project deliverables; learnings were shared with delivery and implementation teams, and all potential risks were mitigated. Participant PM3 didn't see any strategy used during the implementation except pushing ahead:

I didn't, I don't really see any real guidance on the strategy to work through that. I didn't, I did not see it.

Participant PM4 named some of the important strategies as implementing global practices before the tools were ready; identifying the gaps and workarounds between the global practices and the local requirements; regular status calls with global teams, deployment teams, and business process teams; strong global process ownership within the company business; change management effort; considerable training effort prior to going live; and live environment simulations.

Project team member role response highlights. Whereas TM1 and TM4 were not aware of strategies used

during implementation, TM2 highlighted two key strategies, reuse of human resources with past experience and building core competency within internal staff. Participant TM3's stated strategies included continuous improvement projects initiated to reduce manual journal entries, corrections, and fixes, as well as to reduce emergency responses, manual interventions, and user overrides during post go-live. TM3 further added:

There was never any catastrophic issue at quarter end or a year end [cough]. We were able to submit on time to our global submitters, able to do our annual reports on time, so we haven't [pause] so we were able to submit to tax authorities on time [pause] so you know, I think there was a focused approach to ensure that we hit our deadlines. The main issues were around supplier agreements, such as taxes, EDI tax, excise duty issues, and incorrect pricing. It took a focused effort of over nine months to get these issues worked out through the system.

Regarding customer master area, TM4 indicated that a document requesting specific fields was sent out to customers using mass communication; the company also hired a few extra people to follow up with customers to get the information and brought in some resources from the global case organization for support. The strategies stated by TM5 included use of delta loads during the no-fly zone and pulling resources with experience in business streams from global community to provide support; the latter was also a mitigating measure. Redeploying people, bringing SMEs to the project, and allocating time and resources were some of the strategies mentioned by TM6.

Business user role response highlights. Participant BU1 was not entirely sure but stated that the regular engagement of global process experts was one of the strategies used. Participant BU2 described clear communications, bringing people on board, time checks and evaluations, and a large number of meetings to reassure workers. BU3 highlighted hands-on training, following the no-fly zone, and putting the project team with the business on the same floor. Mitigating actions included blocking a customer's wrong customer accounts, making personal calls to customers, involving project teams in manual invoice corrections, and use of hyper-care phone lines to deal customer complaints. Participant BU3 added:

Say a customer have been billed twice by accident; we just immediately pushed them the money back rather than just doing the whole corrections, we just gave them the money back. Because we know there was a mistake, we can tell them it's a mistake, and some of them, in retail somebody running a gas station, this could be a very small business, billing them twice, or billing them a few load that didn't go to them, that could make them not be able to pay their employees.

Participant BU4 asserted that obtaining guidance from experts and seeking help from managers were some of the strategies used. According to BU5, having the right people to support the business was the best strategy. BU5 said it was important to reduce stress on people, which could be achieved by massages, stretches, food and drink, time off, and recognition with money and awards. For BU6, it was meetings and workshops; however, BU6 stated, "I can't answer that question for the strategies, because I wasn't part of the strategic part of it, right." BU7 described many meetings and a great deal of testing as some of the strategies used.

Significance of strategies to overcome challenges

The study highlighted the importance of strategies needed to overcome critical challenges (Table 3; Figure 1). Whereas 60% (12 out of 20) of the participants agreed that strategies helped overcome the challenges, 30% (6 out of 20) partially agreed that strategies also helped overcome the challenges. However, two participant responses to Interview Question 11, one from a project manager and another from a business user, did not agree that the strategies helped overcome the challenges.

Table 3. The Ability of Strategies to Help Overcome the Challenges in ERP Implementation as Reported by Members of the Project Role Groups

Strategies help overcome challenges	Senior Leader	Project Manager	Project Team Member	Business User
Strategies help overcome challenges—Agree	1	2	4	5
Strategies help overcome challenges—Partially agree	2	1	2	1
Strategies help overcome challenges— Do not agree	—	1	—	1
Total	3	4	6	7

Note. The table highlights the importance of strategies to overcome critical challenges during ERP implementation. This is based on high-frequency count across all four project role groups. A dash indicates that no member of the group gave this response.

Senior leader role response highlights. The adopted strategies, such as reporting measures and ad-hoc groups,

helped troubleshoot problems, resolve problems, capture learning, update processes so that mistakes weren't repeated, and had a strong mitigating effect across organization, according to SL1. Sticking to standard processes, minimizing change, and implementing the standard template reduced issues for the business. Also, strong leadership support and commitment showed success to finance implementation. Participant SL2 added:

Even though finance was one of the most difficult implementations, the commitments from their senior leaderships were so strong. I think it made a huge difference. Our company controller was also... 100% committed to the success of this, and it think it showed in, actually in our finance processes. We are not the ones that causes the issues [pause, laugh] we could close the books [pause] ehh you know we could do our government reporting, taxation and so on, it wasn't perfect by any means, but I think I think that really helped. Yeah.

Project manager role response highlights. Participant PM1 emphasized the importance of risk management and use of production data during testing phases. This improved data quality improvement by 30%, reducing the number of issues at go-live. PM3 did not state any implications and added:

I didn't see a lot and, even from myself, kind of moved on fairly quickly. Um, I don't really know how to answer that because I did not, I was not present for that, and no direct experience much about that.

According to PM2, the strategies helped for most part, and communicating changes and notifying the external stakeholders provided them with the opportunity to be aware of the changes in advance. Participant PM4 observed that the organization had established ways to resolve and support issues based on previous implementations in several countries.

Project team member role response highlights. While the project moved through testing and data conversation iterations, there was a need to obtain business sign-offs, and these sign-offs could be obtained only applying the strategies, according to TM1. One of the points noted by TM2 regarded data cleansing activities and strategies to advance them. The key here is to clearly communicate what is changing and the rationale behind it: that it can improve the data quality. Minimizing customization is an important strategy, as noted by TM2:

So again, you don't want to be in a situation, and this is not just with the ERP system, it's really with a lot of IT systems now, where you are heavily customized because then they can really take lot of run maintain costs and individual specific skill sets that you need to be able to support something. So I think you can take kind of out of the box install and minimize customization as much as possible.

Participant TM3 spoke about the strategy of manual intervention after go-live to allow business to move product, buy, sell, and continue in real time. The manual interventions were allowed only for minor periods and the task force allowed fixes and corrections to manage end-to-end process and manage issues effectively. The task force or the core team was composed of skilled resources and was formed after the go-live to tackle inventory reconciliations, cancellations and rebilling, and invoice corrections. The business also used risk management processes and a defect system to track issues to ensure that items were fixed. Skilled resources from the global team helped in the push near the end of the project with mass uploads; however, according to TM4, "it's hard to think of things that strategically they did that helped, because it felt like it went so poorly at go-live." Participant TM5 added that the strategies on data load and data quality worked well with the support of global consultants. TM6 stated that the strategies worked well during implementation for data conversion and testing. Being realistic, understanding risks, being open to ideas, and adapting to change are some of the strategies suggested as important by TM6.

Business user role response highlights. According to participant BU1, regular engagements with global process experts helped the team gain knowledge, understand the global process, and think outside the box to streamline the process. However, BU1 argued:

I wouldn't say that the strategies always helped us to overcome the challenges. However, I suppose it did help mitigate some of them.

Participant BU2 stated that the strategies forced people to participate, even with lot of resistance, and that management had good intentions to take people on board and participate in the program. On overcoming challenges, BU2 added:

Um, at some level, you know, yeah. Again my thought is up front, helping, really people understanding what each step of the process is and what it means to them and being able to convey it to them.

Participants BU3, BU4, BU6, and BU7 observed that strategies helped overcome challenges. Flying in experts to work with the business during hyper-care was a good strategy, according to BU5. However, the knowledge

sharing was limited, as these experts were working on strict timelines to fix problems and deliver. These experts were gone after 4 weeks, and the business had to bring in another team who had “no idea of what’s going on.” So, this strategy resulted in a short hyper-care period, after which the experts who were responsible for implementation were gone and the business had to bring in new people.

Research findings indicated 29 strategies (Appendix A), from which top six themes on strategies (Table 1) and four mitigating actions were highlighted (Table 2). Specifically, the strategies were significant to overcome the challenges during ERP implementation, which was acknowledged by all ERP project role groups (Figure 1).

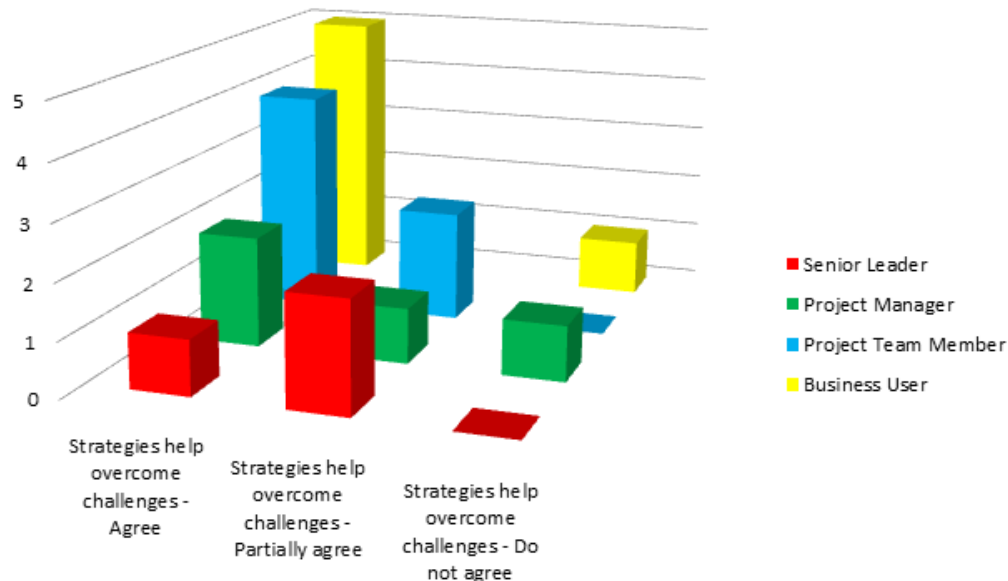


Figure 1. Significance of strategies to overcome critical challenges, as answered by members of each of the four project role groups.

In triangulating responses, it became apparent all the four ERP project role groups—senior leader, project manager, project team member, and business user—responded evenly toward the strategies and their significance to overcome the critical challenges. The majority of participants across all project role groups indicated the importance of having the right people and guidance from experts (nine out of 20 participants, 45%) and change management (five out of 20 participants, 25%). Regarding strategies on clear communications and lots of testing, the participants from senior leader or the project manager role group was unable to provide any feedback. Participants also responded to seeing significant power in the strategies of hands-on training (15%) and risk management strategies (15%).

7. Key Themes

The strategies and mitigating actions (see Table 4) that emerged from interview responses can be used to overcome critical challenges in ERP implementation (Menon, 2016; Menon et al., 2019). Six key themes on strategies and four themes on mitigating actions were unpacked from interview responses based on high frequency counts. Among the key strategies named, references were found in the literature for risk management (Jayaraman & Bhatti, 2008), change management (Finney & Corbett, 2007; Hasibuan & Dantes, 2012; Jayaraman & Bhatti, 2008; Poti, Bhattacharyya, & Kamalanabhan, 2010; Somers & Nelson, 2001), hands-on training (Somers & Nelson, 2001), clear communications (Holland & Light, 1999; Nah, Lau, & Kuang 2001; Jayaraman & Bhatti, 2008), and having the right people for support and guidance from experts (Parr & Shanks, 2000; Tsai, Shaw, Fan, Liu, Lee, & Chen, 2010).

Table 4. Strategies and Mitigating Actions

Strategies & Mitigating Actions	Literature
Having the right people for support and guidance from experts Change management	Parr & Shanks, 2000; Tsai et al., 2010 Somers & Nelson, 2001; Finney & Corbett, 2007; Jayaraman & Bhatti, 2008; Poti et al., 2010
Clear communications	Holland & Light, 1999; Nah et al., 2001; Jayaraman and Bhatti, 2008
Hands-on training	Somers & Nelson, 2001
Lots of testing	Doom, Milis, Poelmans, & Bloemen 2010; Finney & Corbett, 2007; Nah et al., 2001
Risk management	Jayaraman & Bhatti, 2008; Salmeron & Lopez, 2012
Manual interventions	—
Reduce stress of people by recognition, time offs	—
Making personal calls to customers	—
Blocking wrong customer accounts	—

Note. Themes on strategies and mitigating actions are based on highest frequency count. Literature is the corresponding research literature. A dash indicates that the theme was not found in the literature.

The first strategy can be summarized as “having the right people to support the business and guidance from experts.” According to participant BU5, “Having the right people to support the business was the best strategy. It is to connect the people, the doer with the people that knew about it, and [this could] really change things around.” Participant SL1 underscored the importance of change management as a strategy that can overcome challenges, explaining it as “figure out root causes and implement changes to eliminate the root causes.” As explained by participant TM2, “clear communications” are an important strategy as well, and the ability to “communicate in a clear manner [on] how stuff is changing and the rationale behind it, I think helped improve” and overcome challenges (TM2).

“Hands-on training” and considerable training effort are required to overcome the challenges (BU3; PM4). Many interview responses also stressed the importance of testing. Participant BU7 emphasized this strategy: “lots of testing, I was involved in the testing and I had to test with people higher in the company to know how to work on it, [and] nothing was left behind.” The final strategic theme highlighted was “risk management,” and this strategy was underscored by doing “a lot of risk management exercise” (PM1), having “enough people with right skills” (PM1), and continued “use of defect system” (TM3).

Among mitigating actions (Table 2), the first mitigating action adopted to overcome challenges was to use “manual interventions.” Manual intervention is an effective mitigating action, especially when making invoice corrections (BU3). For reducing stress on people, participant BU5 indicated giving people time-offs, recognizing efforts with money, and engaging in relaxing processes such as massages and having food delivered. The third mitigating action discussed was “making personal calls to customers” to apologize for erroneous invoices, arrange a credit, and give the customer advance notice (BU3). Finally, “blocking wrong customer accounts” is another mitigating action effectively adopted by the organization so that customers were not wrongly charged (BU3).

The implication of the finding addresses change management; the current study supports the study of Poti et al. (2010), which indicated the significance of implementing change as well as guiding people through the change management process. The change management strategy, which uses an integrated framework of knowledge formulation, strategy implementation, and status evaluation, can be also used to overcome resistance to change during implementation (Aladwani, 2001). Whereas literature produced other change management models, change management as a strategy is crucial and significant, since ERP implementation involves changes to processes, people, and system (Bourrie, Sankar, & McDaniel 2012; Edwards & Humphries, 2005; Hasibuan & Dantes, 2012; Kotter, 2012; Malek & Yazdanifard, 2012; Schniederjans & Yadav, 2013; Stapleton & Rezak, 2004).

The second implication of the finding addresses risk management, supporting the key area of uncertainty in project complexity (Besner & Hobbs, 2012; Salmeron & Lopez, 2012). Whereas in effective project management, answers can be found for known problems and known unknowns (Chapman & Ward, 1997), unplanned outcomes can result from significant deviations from plan. Differences during realization and execution can affect the project plan (Pundir, Ganapathy, & Sambandam, 2007). A proper risk management plan using defect logs, as adopted by the case organization, can be used to effectively capture systems issues during implementation.

8. Conclusion

The research study on strategies and mitigating actions for ERP implementation is expected to increase organizational prospects toward project success. The literature espouses many strategies that can be adopted during ERP implementation, yet these strategies are not fully recognized by organizations. The current study examined a large-scale ERP implementation in the Canadian oil and gas industry. The strategies and mitigating actions that emerged from interview responses can be effectively used to overcome critical challenges in ERP implementation. Six key themes on strategies and four themes on mitigating actions were unpacked from interview responses based on high frequency counts. References were found in the literature for key strategies that include change management (Finney & Corbett, 2007; Hasibuan & Dantes, 2012; Jayaraman & Bhatti, 2008; Poti et al., 2010; Somers & Nelson, 2001), risk management (Jayaraman & Bhatti, 2008), hands-on training (Somers & Nelson, 2001), clear communications (Holland & Light, 1999; Nah et al., 2001; Jayaraman & Bhatti, 2008), and having the right people for support and guidance from experts (Parr & Shanks, 2000; Tsai et al., 2010).

Like other exploratory case studies, this study has limitations. Although the selected sample size was within norms and appropriate, the sample size was not significant enough to generalize study population (Marshall, Cardon, Poddar, & Fontenot, 2013; Yin, 2011). The selection of 20 participants from four project role groups of senior leaders, project managers, project team members, and business users allowed acquisition of productive data on strategies and mitigating actions in ERP implementation. The researcher therefore believes that if the study were to be replicated, it would be necessary to avoid having a general senior leader group and instead add a business leader group and an IT leader group to get the perspectives of both the business and IT from senior leadership, instead of one single role group of senior leaders. The strategies and mitigating actions generated by the current study add to the body of knowledge. A suggestion to organizations undertaking future implementations would be to review the list of strategies and mitigating actions generated by the current study.

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Appendix A. Full List of Strategies Used to Overcome Challenges in Erp Implementation

Strategies used to overcome challenges	Senior Leader	Project Manager	Project Team Member	Business User
Building competency within internal staff	–	–	1	–
Change management	2	1	1	1
Changing leadership	–	1	–	–
Checks and evaluations	–	–	–	1
Clear communications	–	–	1	2
Continuous improvement projects	–	–	1	–
Deploying resources back to business	1	–	1	–
Didn't see any strategies used	–	1	2	–
Established ways to support based on previous implementations	–	1	1	–
Follow no-fly zone	–	–	1	1
Get people on board	1	–	–	1
Hands-on training	1	1	–	1
Having the right people for support and guidance from experts	1	–	4	4
Implementation methodology	1	–	–	–
Live environment simulations	1	1	–	–
Lots of testing	–	–	1	2
Lots of meetings to reassure people	–	–	–	2
Not involved in the strategy	–	–	–	1
Project leadership was determined to deliver on time and on budget	1	–	–	–
Properly operating disputes systems	1	–	–	–
Putting project team with the business on the same floor	–	–	–	1
Regular engagement with the global process experts	–	–	–	1
Resourcing project team	2	–	–	–
Risk management	–	1	2	–
Seeking help from managers	–	–	–	2
Strong senior leadership commitment	1	–	–	–
Temporary reporting measures	1	–	–	–
Use of production data for testing	–	1	–	–
Well-defined and rigorously applied project methodology	1	–	–	–
Total	15	8	16	20

Note. The table shows all 29 strategies used by the case organization that can overcome critical challenges during ERP implementation. This is based on high-frequency count across all four project role groups. A dash indicates that no member of the group reported the strategy.

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