



HITTING THE EASY BUTTON: THE CASE FOR OFF-THE-SHELF ENTERPRISE RESOURCE-PLANNING SYSTEM SOLUTIONS

Major Dionysios Gosselin

JCSP 50

Service Paper

Disclaimer

Opinions expressed remain those of the author and do not represent Department of National Defence or Canadian Forces policy. This paper may not be used without written permission.

© His Majesty the King in Right of Canada, as represented by the Minister of National Defence, 2024.

PCEMI n° 50

Étude militaire

Avertissement

Les opinions exprimées n'engagent que leurs auteurs et ne reflètent aucunement des politiques du Ministère de la Défense nationale ou des Forces canadiennes. Ce papier ne peut être reproduit sans autorisation écrite.

© Sa Majesté le Roi du chef du Canada, représenté par le ministre de la Défense nationale, 2024.

CANADIAN FORCES COLLEGE - COLLÈGE DES FORCES CANADIENNES

JCSP 50 - PCEMI n° 50
2023 - 2024

Service Paper – Étude militaire

**HITTING THE EASY BUTTON: THE CASE FOR OFF-THE-SHELF
ENTERPRISE RESOURCE-PLANNING SYSTEM SOLUTIONS**

Major Dionysios Gosselin

“This paper was written by a candidate attending the Canadian Forces College in fulfilment of one of the requirements of the Course of Studies. The paper is a scholastic document, and thus contains facts and opinions which the author alone considered appropriate and correct for the subject. It does not necessarily reflect the policy or the opinion of any agency, including the Government of Canada and the Canadian Department of National Defence. This paper may not be released, quoted or copied, except with the express permission of the Canadian Department of National Defence.”

« La présente étude a été rédigée par un stagiaire du Collège des Forces canadiennes pour satisfaire à l'une des exigences du cours. L'étude est un document qui se rapporte au cours et contient donc des faits et des opinions que seul l'auteur considère appropriés et convenables au sujet. Elle ne reflète pas nécessairement la politique ou l'opinion d'un organisme quelconque, y compris le gouvernement du Canada et le ministère de la Défense nationale du Canada. Il est défendu de diffuser, de citer ou de reproduire cette étude sans la permission expresse du ministère de la Défense nationale. »

HITTING THE EASY BUTTON: THE CASE FOR OFF-THE-SHELF ENTERPRISE RESOURCE-PLANNING SYSTEM SOLUTIONS

AIM

1. Enterprise resource planning systems (ERP) are key organizational programs that integrate multiple functions into an efficient digital workspace. Acquisition and management of an ERP is a large investment and must be selected methodically to ensure it fits organizational needs. The Canadian Armed Forces (CAF) and the Department of National Defence (DND) utilize ERPs to consolidate logistic support across multiple functions. Over time multiple programs have been added to the ERP infrastructure to attempt better functionality or to capitalize on technology. This resulted in a series of systems that are customized to their respective operational communities and require constant efforts to be interoperable from technical and process perspectives. These efforts require increasing amounts of funding and personnel that could be more optimally applied across the institution. The current strategies for modernizing and consolidating these overlapping programs must be adjusted to avoid acquiring additional customized systems in favour of commercial off-the-shelf (COTS) solutions used across industry. The organizational logistics of the CAF/DND is not uniquely military and ERP modernization efforts must be focused on enabling COTS solutions to achieve its institutional priorities.

INTRODUCTION

2. The CAF/DND currently uses multiple overlapping systems to manage corporate institutional logistics functions. These systems are a combination of programs procured from industry combined with internally developed and customized interfaces. These programs overlap across functions where no single system is used to manage departmental financial, human, and materiel resources. The absence of an ERP strategy has created duplicated systems that increase personnel requirements to provide and maintain these corporate functions. To optimize logistical efforts, the CAF/DND must orient its current strategy to consolidate these systems. Instead of developing further customized solutions the strategy must maximize the use of the Treasury Board (TB) defined ERP standards for SAP and Oracle service providers.¹ To achieve consolidation the organization needs to review and challenge the persistence of customized internal systems with a view to adopt COTS solutions from industry for non-military-centric processes.

3. There are three core functions supported through ERPs at a corporate level that are not inherently military functions. These three exist in separate programs and sub-programs that enable the management of departmental finances, human resources, and materiel. This analysis outlines how these corporate functions can benefit from COTS solutions from service providers that have readily available modules for implementation. The CAF/DND's corporate logistics has multiple similarities to a large complex industry and requires identical systems to optimize the use of limited personnel resources. The proper selection and investment in ERP solutions is a critical

¹ "Standard on Enterprise Resource Planning Systems," Treasury Board of Canada, Canada, Last updated May 10, 2012, <https://publications.gc.ca/site/eng/9.852008/publication.html>

factor that determines an organization's long-term viability.² Consolidation of systems increases the availability of scarce personnel resources towards logistics capacity in operations domestically and abroad.

DISCUSSION

4. Developing an enterprise strategy must incorporate the impact of integration between different institutional functions. Financial cost is a reality of procurement and will be comparable between industry leading service providers. Additionally, there are personnel and process related costs associated with procuring ERPs that surface when a system does not correctly fit organizational needs.³ In a Government of Canada (GOC) procurement framework it is necessary to define these ERP efficiency costs in the statement of requirement to align with a COTS strategy. Currently the CAF/DND are undergoing the Defence Resource Business Modernization Programme (DRBMP) as a follow-on to commitments in Strong Secure Engaged (SSE). However, the initiative has limited scope that does not integrate the three core corporate functions. For example, human resources activities such as payroll, personnel information management, and personnel evaluation are excluded from DRBMP consolidation.⁴ The strategy is separately updating the financial management system through the next Defence Resource Management Information System (DRMIS) module and materiel sub-programs within the Modernization & Integration of Sustainment and Logistics (MISL) into SAP.⁵

5. This piecemeal approach increases dependencies on systems integration contracts and services. Most CAF/DND related resources are contained in the department's official systems of record,⁶ for finances it is the TB standard of SAP, and for human resource management (HRM) it is the PeopleSoft/Oracle platform. Both systems continue to have applications designed to address customized solutions across functional resource management activities. Each of the applications come at an additional resourcing cost of funding, personnel, and institutional capacity for implementation. Therefore, each customized system generates an additional set of these respective costs. An effective ERP strategy requires that these efforts are consolidated to optimize

² Mahmood Ali and Lloyd Miller, "ERP System Implementation in Large Enterprises – a Systematic Literature Review," *Journal of Enterprise Information Management* 30, 4 (2017): 671. <https://dx.doi.org/10.1108/JEIM-07-2014-0071>.

³ Meg Fryling, "Investigating the Effect of Customization on Rework in a Higher Education Enterprise Resource Planning (ERP) Post-Implementation Environment: A System Dynamics Approach." *Journal of Information Technology Case and Application Research* 17 (2015): 11. <https://dx.doi.org/10.1080/15228053.2015.1014750>.

⁴ "Assessment of the Defence Resource Business Modernization Programme November 2021," Assistant Deputy Minister (Review Services), Department of National Defence, Canada, Last modified March 3, 2022, <https://www.canada.ca/en/department-national-defence/corporate/reports-publications/audit-evaluation/assessment-defence-resource-business.html>

⁵ "How DND / CAF is modernizing Warehousing and Distribution – What is MISL?" Canadian Armed Forces Strategic Joint Staff (SJS), Department of National Defence, Canada. Accessed February 17, 2024. https://collaboration-sjs-emis.forces.mil.ca/sites/sjs_operations/DG_Support/StatJ4SustainmentReadiness/MISL/SitePages/The%20MISL%20Initiative.aspx.

⁶ "Standard on Enterprise Resource Planning Systems." Treasury Board of Canada, Canada, Last updated May 10, 2012, <https://publications.gc.ca/site/eng/9.852008/publication.html>

the capacity for employees to use them.⁷ To mitigate the costs of customization, the CAF/DND must adjust the perspective associated with ERP implementations. The ERP must not be designed to fit the CAF/DND, the organization must focus on adjusting its processes to fit the system and leverage its efficiency. Failure to adjust processes increases the risk that COTS solutions will evolve into additional customized systems. This cycle exists in current ERPs within the CAF/DND where there are regular modification schedules to implement software customizations.⁸ The current CAF/DND approach, in this case, is to expend resources to modify the system instead of modifying the process or policy. As a result, assessing the extent that COTS solutions can be accommodated in conjunction with government process requirements is fundamental to an ERP consolidation strategy.

6. To initiate a consolidated ERP strategy the first phase is to categorize the customized systems that draw data from the core SAP/Oracle sources. The focus on where the systems overlap between functions, directorates, and processes is critical to identify where gaps may surface in a COTS ERP system. ERP research has mainly focused on implementation and post-implementation phases that corresponded with an industry-wide estimate that approximately 70% of implementations fail to achieve their goals on time or on budget.⁹ Therefore the pre-implementation assessment phase must be completed to identify areas currently functioning under customized applications and which related systems influence those operations. From that assessment, current systems can be individually compared to functions which have an available COTS counterpart and whether the work sequence aligns or deviates from processes tied to GOC policy. For example, a self-automated claims payment system would not meet departmental obligations under the Financial Administration Act for delegated authorities in comparison to current interfaces. Between industry and public institutions, it is this form of legislative transparency that makes automation more restricted in a government context.¹⁰ Once these initial assessments identify whether a module can be utilized, the follow-on financial comparison can be completed for COTS versus the integration cost for customized systems to function with Oracle/SAP.

7. Following initial determination that a COTS solution can achieve departmental requirements, while meeting legislative minimums, the comprehensive review of the function can proceed. Comprehensive review includes the implementation and post-implementation processes that characterize the workflow of the program.¹¹ This includes the level of in-service-support (ISS) for the application, the personnel required to provide support to users, and the training

⁷ Deep, Aman, Peter Guttridge, Samir Dani, and Neil Burns. "Investigating Factors Affecting ERP Selection in Made-to-order SME Sector." *Journal of Manufacturing Technology Management* 19, 4 (2008): 435. <https://dx.doi.org/10.1108/17410380810869905>.

⁸ Canada. Department of National Defence, "Evaluation of the Defence IM/IT Programme June 2020," November 9, 2020, <https://www.canada.ca/en/department-national-defence/corporate/reports-publications/audit-evaluation/evaluation-defence-imit-programme.html>

⁹ Mahmood and Miller, "ERP System Implementation in Large Enterprises – a Systematic Literature Review," 667.

¹⁰ Douglas, Scott, Paul 't Hart, and Judith Van Erp, "Identifying and Interpreting Government Successes: An Assessment Tool for Classroom Use," *Teaching Public Administration* 40, 2 (2022): 284. <https://dx.doi.org/10.1177/01447394221079687>.

¹¹Ng, Celeste See-Pui and Guy G. Gable, "Maintaining ERP Packaged Software – a Revelatory Case Study," *Journal of Information Technology* 25 (2010): 80. <https://dx.doi.org/10.1057/jit.2009.8>.

infrastructure to enable system usage across the organization. Within this full spectrum review of ERP implementation is the comparison between COTS modules provided from the core systems, SAP/Oracle, and those built internal to CAF/DND. It is at this point where CAF/DND can observe departures in resource intensity between self-generated applications and those that already exist. Pre-existing applications from SAP/Oracle do not need integrator services because their modules are already configured for their system. As a result, a COTS module does not require an additional ISS contract to enable its functioning because it is already organic to that programming suite.¹² Subsequently, the ISS integration cost would be limited to how the module communicates with the other TB systems of record, if applicable. Comparatively, the integration chain for a customized program would be approximately double if it required integral data pulled from both SAP and Oracle. For example, the process for departmental travel claims through the current Claims X system. To function, this system requires integration between SAP to code financial transactions and Oracle to link the respective payment to the proper personnel service number and banking information.¹³ This customized application was built by the CAF/DND and managed by its personnel rather than the COTS modules available in SAP/Oracle inventories. Any changes to these applications require integration efforts or services between all three systems.

8. ERP consolidation efforts naturally have risks that must be addressed to safeguard core institutional functions. The first risk is large-scale data loss. Departments have legislative requirements for information across data classifications.¹⁴ The majority of financial, HR and materiel data is not classified as secret and is publicly accessible. These information sets already reside within SAP/Oracle, therefore, the risk associated with data loss increases if either system is replaced as the TB system of record. A replacement of one, or both, systems would necessitate a data migration strategy in conjunction with implementation. Given that TB is the authority to change the SAP/Oracle standard, this risk is low in the foreseeable future. However, transitioning from customized applications to COTS modules would increase CAF/DND responsiveness to future scenarios that would involve a new ERP as the TB standard. Transitioning to a new baseline system other than SAP/Oracle would necessitate a re-integration of each customized program to function with the new ERP. The number of these programs would therefore increase the risk of data loss during integration. This risk exists due to the number of interaction points between the core SAP/Oracle system and customized applications. Overall, the trade-off for CAF/DND is between the divestment of custom applications in favour of new ones at a cost of additional integration contracts, or to acquire modules from a next generation ERP system where the cost would be the restructuring of organizational processes. Clearly, continued customized applications to solve CAF/DND requirements makes these system integrations more difficult and

¹² Ketrick, Paul, John Bailey, Marilee Cunningham, Laura Odell, Graeme Douglas, Dawn Floyd, Anthony Insolia, *Assessment of DoD Enterprise Resource Planning Business Systems* (Alexandria: Institute for Defense Analysis February, 2011.), B-1. <https://apps.dtic.mil/sti/tr/pdf/ADA563798.pdf>

¹³ “Guideline on Common Financial Management Business Process 3.1 – Manage Procure to Payment,” Canada, last modified 1 October, 2012. <https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=24970>

¹⁴ “Government of Canada Enterprise Architecture Framework,” Treasury Board of Canada, Canada, last updated 13 July, 2021. <https://www.canada.ca/en/government/system/digital-government/policies-standards/government-canada-enterprise-architecture-framework.html>.

costly. Ultimately, transition efforts to consolidated COTS modules in the near term can mitigate the future challenges in subsequent modernization initiatives.

9. The second risk is the impact of ineffective implementation. The common argument against changing legacy systems is the risk associated with failure of corporate responsibilities that impact personnel and operations. The implementation of Pheonix Pay remains the example of organizational failure in implementing a new customized system. The results from the Pheonix implementation demonstrate why customized systems should be avoided and how COTS solutions are better alternatives. While the procurement of Pheonix pay was a competitive process, the winning bidder was a non-SAP/Oracle related company (IBM).¹⁵ Therefore, selecting a provider outside of the department's SAP/Oracle license necessitated additional integration efforts, costs, and risks. A COTS module from SAP/Oracle exists and is regularly used in industry. The initiative also did not transition the payroll function in manageable sequences,¹⁶ ultimately resulting in system failure. Clearly, selecting an integration software service was a risk assumed in the procurement process. The department effectively executed the Pheonix implementation without adequate small group testing of pay processes, without implementing in a non-sequential fashion, and without back-up redundancies.¹⁷ One benefit from the scale of failure for Pheonix is that numerous observations can be used to prevent the re-occurrence. Key lessons learned for CAF/DND in assessing the future CAF payroll system will be to apply these mitigation steps to avoid a repeat of the Pheonix implementation.

10. Following the consolidation of systems that qualify for COTS solutions is the assessment of personnel training and infrastructure. Common to ERPs and customized programs are three elements for their utilization. First is the local access control responsibility. Both systems require levels of authority for data access and available entry points to determine these privileges. ERP systems also differ regarding the number of access providers and at which levels they are employed to varying degrees of customer responsiveness.¹⁸ The second requirement is the respective help desk to troubleshoot technical difficulties. Centralized helpdesks are an important function that address technical anomalies. This becomes challenging when the help desk performs dual roles of systems troubleshooting and policy interpretation. Overlapping processes across different systems increases the risk of policy ambiguity and makes it more likely that these centralized entities will be pressured to provide policy clarification. However, with common operating platforms this ambiguity is reduced. Centralized help desks can then re-direct policy inquiries back to local management because it can better distinguish them from program anomalies. Finally, is the training establishment on access, use, and functionality. While there are

¹⁵ "Phoenix: Standing Committee on Government Operations and Estimates – June 10, 2022," Public Services and Procurement Canada, Canada, last modified 10 May, 2023, <https://www.tpsgc-pwgsc.gc.ca/trans/documentinfo-briefingmaterial/oggo/2022-06-10/p3-eng.html>.

¹⁶ "2018 Spring Report of the Auditor General of Canada. Report 1 – Building and Implementing the Phoenix Pay System." Office of the Auditor General of Canada, accessed February 14, 2024, https://www.oag-bvg.gc.ca/internet/english/parl_oag_201805_01_e_43033.html.

¹⁷ Shaul, Levi and Doron Tauber, "Critical Success Factors in Enterprise Resource Planning Systems: Review of the Last Decade," *ACM Computing Surveys* 45, 4 (2013): 22. <http://dx.doi.org/10.1145/2501654.2501669>.

¹⁸ Ayağ, Z. and R. Özdemir, "An Intelligent Approach to ERP Software Selection through Fuzzy ANP," *International Journal of Production Research* 45, 10 (2017): 2171. <https://doi.org/10.1080/00207540600724849>.

some levels of formalized training on current customized programs, the Assistant Deputy Minister Review Services in its audits of financial, HRM, and materiel systems observes that most training is done on-the-job.¹⁹ Each customized system generates this triad of infrastructures in addition to software integration to operate with SAP/Oracle. Accounting for each structure will identify available resources for re-allocation towards supporting a consolidated COTS solution. The personnel resources from these areas therefore increases available capacity amongst the military trades operating these systems. A COTS module will therefore generate a more consolidated ERP infrastructure for access, training, and support that is common across systems instead of unique to each function.

11. Overall, the success of consolidated ERPs utilizing COTS modules will be based on the value added to end users and the operational customer base. The final factor favouring COTS modules is their pre-developed useability, interface, and capacity for automation. The core of effective ERP applications, COTS or customized, is the user interface where data manually enters the system from transactions taken by individuals. The simpler the interface the more efficient the system and the more likely users will adapt to new processes during implementation. Industry producers are constantly updating system interfaces to ensure products remain competitive. Customized legacy systems reach capacity at the range of “medium” sized organizations where complexity between departments makes any single program inefficient to meet corporate needs.²⁰ Given that this effort is being organically conducted within the service providers, CAF/DND does not need to expend efforts refining interfaces. For example, Microsoft 365 interface updates are generated external to departmental requests because the product’s licensing cost incorporates these improvements. Comparatively, CAF/ DND is responsible for interface innovation when using a customized application because programming is generated internally or through contractors. In theory, the subject matter experts for respective processes would produce optimal recommendations for interfaces. However, this tends to generate work intensive interfaces because designers may have management goals in mind when defining lower-level processes.²¹ One notable example is the duplicated HRM systems Monitor Mass and Guardian that draw from Oracle data. Each has a customized interface that is managed by separate ISS requirements to provide unique user interfaces for routine items like leave and employee data.²² Leveraging user interface efficiencies where industry has already identified areas most effective for processes is an efficiency that COTS modules provide. Accepting this capacity as a benefit and aligning CAF/DND processes to fit these products enables the organization to capitalize on industry innovation.

¹⁹ “Audit of Military Compensation and Benefits December 2015,” Assistant Deputy Minister (Review Services), Department of National Defence, Canada, accessed February 16, 2024, https://www.canada.ca/content/dam/dnd-mdn/migration/assets/FORCES_Internet/docs/en/about-reports-pubs-audit-eval/253p7050-69-eng.pdf

²⁰ Ng, See-Pui and Gable, “Maintaining ERP Packaged Software – a Revelatory Case Study,” 66.

²¹ Carlsson-wall, Martin, Lukas Goretzki, Jesper Hofstedt, Kalle Kraus, and Carl-johan Nilsson, “Exploring the Implications of Cloud-based Enterprise Resource Planning Systems for Public Sector Management Accountants,” *Financial Accountability and Management* 38, 2 (2021): 194. <https://dx.doi.org/10.1111/faam.12300>.

²² “Search Government Contracts Over \$10,000,” Government of Canada Open Government Database, Canada. Access February 15, 2024. <https://search.open.canada.ca/contracts/>.

CONCLUSION

12. The CAF/DND ERP functions are not unique enough to justify the multiple customized systems used for its internal logistics. Personnel resources are not being used optimally to support financial, HRM, and materiel management operations due to the inefficiencies that surface from duplicated customized programs. The CAF/DND ERP modernization effort must be critical of solutions that increase the number of unique systems that generate overlapping functions and redundant processes. To optimize employment and capacity of logistics personnel the modernization and consolidation efforts must focus on acquiring COTS solutions. By adjusting CAF/DND processes to fit COTS modules, the organization can best leverage ERP industry resources to manage its core logistics functions.

RECOMMENDATION

13. The DRBMP strategy should incorporate selection criteria that favour COTS into the acquisition of subsequent finance, HRM, and materiel management ERP modules. Any statements of requirement for new system acquisitions should specifically compare integration costs against existing SAP/Oracle applications. Lastly, the scope of DRBMP must be expanded to include responsibility for assessing logistics processes that can be adjusted to fit available ERP modules.

BIBLIOGRAPHY

- ADGA. “An Agile approach fits with Canadian Armed Forces’ Dynamic IT needs.” Insights - Case Study. Accessed February 10, 2024. <https://www.adga.ca/insight/mcsc-an-agile-approach-wins-the-day-for-the-canadian-armed-forces-dynamic-it-needs>
- Ali, Mahmood and Lloyd Miller. “ERP System Implementation in Large Enterprises – a Systematic Literature Review.” *Journal of Enterprise Information Management* 30, 4 (2017): 666-692. <https://dx.doi.org/10.1108/JEIM-07-2014-0071>
- Ayağ, Z. and R. Özdemir. “An Intelligent Approach to ERP Software Selection through Fuzzy ANP.” *International Journal of Production Research* 45, 10 (2017): 2169-2194. <https://doi.org/10.1080/00207540600724849>.
- Canada. “2018 Spring Report of the Auditor General of Canada. Report 1 – Building and Implementing the Phoenix Pay System.” Office of the Auditor General of Canada. Accessed February 14, 2024. https://www.oag-bvg.gc.ca/internet/english/parl_oag_201805_01_e_43033.html
- . “Assessment of the Defence Resource Business Modernization Programme November 2021.” Assistant Deputy Minister (Review Services). Department of National Defence. Last modified March 3, 2022. <https://www.canada.ca/en/department-national-defence/corporate/reports-publications/audit-evaluation/assessment-defence-resource-business.html>
- . “Audit of Military Compensation and Benefits December 2015.” Assistant Deputy Minister (Review Services). Department of National Defence. Accessed February 16, 2024. https://www.canada.ca/content/dam/dnd-mdn/migration/assets/FORCES_Internet/docs/en/about-reports-pubs-audit-eval/253p7050-69-eng.pdf
- . “Evaluation of the Defence IM/IT Programme June 2020.” Assistant Deputy Minister (Review Services). Department of National Defence Last modified November 9, 2020. <https://www.canada.ca/en/department-national-defence/corporate/reports-publications/audit-evaluation/evaluation-defence-imit-programme.html>
- . “Government of Canada Enterprise Architecture Framework.” Treasury Board of Canada. Last updated 13 July, 2021. <https://www.canada.ca/en/government/system/digital-government/policies-standards/government-canada-enterprise-architecture-framework.html>
- . “Guideline on Common Financial Management Business Process 3.1 – Manage Procure to Payment.” Last modified 1 October, 2012. <https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=24970>
- . “How DND / CAF is modernizing Warehousing and Distribution – What is MISL?” Canadian Armed Forces Strategic Joint Staff (SJS). Department of National Defence. Accessed February 17, 2024. https://collaboration-sjs-emis.forces.mil.ca/sites/sjs_operations/DG_Support/StatJ4SustainmentReadiness/MISL/SitePages/The%20MISL%20Initiative.aspx

- . “Phoenix: Standing Committee on Government Operations and Estimates – June 10, 2022.” Public Services and Procurement Canada. Last modified 10 May, 2023. <https://www.tpsgc-pwgsc.gc.ca/trans/documentinfo-briefingmaterial/oggo/2022-06-10/p3-eng.html>
- Canada. “Search Government Contracts Over \$10,000.” Government of Canada Open Government Database. Access February 15, 2024. <https://search.open.canada.ca/contracts/>.
- . “Standard on Enterprise Resource Planning Systems.” Treasury Board of Canada. Last updated May 10, 2012. <https://publications.gc.ca/site/eng/9.852008/publication.html>.
- Carlsson-wall, Martin, Lukas Goretzki, Jesper Hofstedt, Kalle Kraus, and Carl-johan Nilsson. “Exploring the Implications of Cloud-based Enterprise Resource Planning Systems for Public Sector Management Accountants.” *Financial Accountability and Management* 38, 2 (2021): 177-201. <https://dx.doi.org/10.1111/faam.12300>.
- Deep, Aman, Peter Guttridge, Samir Dani, and Neil Burns. “Investigating Factors Affecting ERP Selection in Made-to-order SME Sector.” *Journal of Manufacturing Technology Management* 19, 4 (2008): 430-446. <https://dx.doi.org/10.1108/17410380810869905>.
- Douglas, Scott, Paul ‘t Hart, and Judith Van Erp. “Identifying and Interpreting Government Successes: An Assessment Tool for Classroom Use.” *Teaching Public Administration* 40, 2 (2022): 276-296. <https://dx.doi.org/10.1177/01447394221079687>.
- Fryling, Meg. “Investigating the Effect of Customization on Rework in a Higher Education Enterprise Resource Planning (ERP) Post-Implementation Environment: A System Dynamics Approach.” *Journal of Information Technology Case and Application Research* 17 (2015): 8-40. <https://dx.doi.org/10.1080/15228053.2015.1014750>.
- Ketrick, Paul, John Bailey, Marilee Cunningham, Laura Odell, Graeme Douglas, Dawn Floyd, Anthony Insolia, *Assessment of DoD Enterprise Resource Planning Business Systems* (Alexandria: Institute for Defense Analysis February, 2011.). <https://apps.dtic.mil/sti/tr/pdf/ADA563798.pdf>.
- Kharuddin, Saira, Soon-Yau Foong, and Rosmila Senik. 2015. “Effects of Decision Rationality on ERP Adoption Extensiveness and Organizational Performance.” *Journal of Enterprise Information Management* 28, 5 (2015): 658-679. <https://dx.doi.org/10.1108/JEIM-02-2014-0018>.
- Ng, Celeste See-Pui and Guy G. Gable. “Maintaining ERP Packaged Software – a Revelatory Case Study.” *Journal of Information Technology* 25 (2010): 65-90. <https://dx.doi.org/10.1057/jit.2009.8>.
- Shaul, Levi and Doron Tauber. "Critical Success Factors in Enterprise Resource Planning Systems: Review of the Last Decade." *ACM Computing Surveys* 45, 4 (2013): 1-39. <http://dx.doi.org/10.1145/2501654.2501669>.