**Abstract**

The advent of enterprise systems established a pathway for organizations to consider innovations by providing a holistic view of the organization ([Klaus et al. 2000](15031-0943-FullBook.docx" \l "Ref_1257_FILE150310943P3018" \o "(AutoLink):Klaus, H., Rosemann, M., and Gable, G. 2000. \“What Is ERP?,\” Information Systems Frontiers (2:2), pp 141–162. UserName - DateTime: sii-4/4/2017 6:12:11 PM)). Prior research on enterprise systems has highlighted the technological, operational and knowledge capabilities provided by enterprise systems in enabling innovation in an organization ([Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:35 PM)). However, the recent introduction of technologies such as cloud computing, mobile, wearables and social media to the corporate IT portfolio means that organizations are now provided with myriad opportunities to innovate. As such, organizations are seeking novel ways to innovate with these new technologies. Therefore, the role of enterprise systems in enabling innovation in the IT portfolio has changed. This chapter provides a discussion on the changing role of enterprise systems in the modern IT portfolio and directs the reader to several ways of how organizations can attain innovation using the IT portfolio.

18

The role of enterprise systems in innovation in the contemporary organization

Darshana Sedera1 and Sachithra Lokuge2

Introduction

Since the 1990s information systems (IS) researchers have investigated the organizations’ use of information technology (IT) for innovation ([Swanson 1994](15031-0943-FullBook.docx" \l "Ref_1292_FILE150310943P3018" \o "(ManLink):Swanson, E.B. 1994. \“Information Systems Innovation among Organizations,\” Management Science (40:9), pp 1069–1092. UserName - DateTime: vge-4/5/2017 12:07:47 PM); [Swanson and Ramiller 2004](15031-0943-FullBook.docx" \l "Ref_1294_FILE150310943P3018" \o "(ManLink):Swanson, E.B., and Ramiller, N.C. 2004. \“Innovating Mindfully with Information Technology,\” MIS Quarterly (28:4), pp 553–583. UserName - DateTime: vge-4/5/2017 12:07:55 PM)). Contrary to the orthodox view of IT’s role as an enabler of innovation, a recent study by [Nambisan (2013](15031-0943-FullBook.docx" \l "Ref_1275_FILE150310943P3018" \o "(AutoLink):Nambisan, S. 2013. \“Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research,\” Journal of the Association for Information Systems (14:4), pp 215–226. UserName - DateTime: sii-4/4/2017 6:12:22 PM)) suggests that IT could plays an advanced role by triggering innovation in an organization. As such, it is evident that contemporary organizations utilize their IT in novel ways to introduce innovation. Since the 1990s organizations have been presented with enterprise systems (ES), which were promoted as a solution to the dotcom bubble ([Ives et al. 2002](15031-0943-FullBook.docx" \l "Ref_1250_FILE150310943P3018" \o "(AutoLink):Ives, B., Valacich, J.S., Watson, R.T., Zmud, R.W., Alavi, M., Baskerville, R., Baroudi, J.J., Beath, C., Clark, T., and Clemons, E.K. 2002. \“What Every Business Student Needs to Know About Information Systems,\” Communications of the Association for Information Systems (9:1), p 30. UserName - DateTime: sii-4/4/2017 6:12:04 PM)). Since then, ES has gained a special prominence in organizations in their ability to enable innovations through the introduction of efficient and effective business processes aiding innovation ([Sedera et al. 2016](15031-0943-FullBook.docx" \l "Ref_1287_FILE150310943P3018" \o "(AutoLink):Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. \“Innovating with Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,\” Information & Management (53:3), pp 366–379. UserName - DateTime: sii-4/4/2017 6:12:32 PM); [Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:35 PM)). Enterprise systems are said to have provided the standardized ‘best practices’ to organizations, at a time when most were struggling to cope with isolated and heavily individualized business processes ([Davenport 2013](15031-0943-FullBook.docx" \l "Ref_1239_FILE150310943P3018" \o "(AutoLink):Davenport, T.H. 2013. Process Innovation: Reengineering Work through Information Technology. Harvard Business Press. UserName - DateTime: sii-4/4/2017 6:11:56 PM)).

Prior research on the ES highlights the importance of the features and functions of ES for innovation through the lens of absorptive capacity ([Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:36 PM)), operational flexibility ([Karimi et al. 2007](15031-0943-FullBook.docx" \l "Ref_1253_FILE150310943P3018" \o "(AutoLink):Karimi, J., Somers, T.M., and Bhattacherjee, A. 2007. \“The Impact of ERP Implementation on Business Process Outcomes: A Factor-Based Study,\” Journal of Management Information Systems (24:1), pp 101–134. UserName - DateTime: sii-4/4/2017 6:12:07 PM)), business process improvements ([Grover and Segars 2005](15031-0943-FullBook.docx" \l "Ref_1249_FILE150310943P3018" \o "(AutoLink):Grover, V., and Segars, A.H. 2005. \“An Empirical Evaluation of Stages of Strategic Information Systems Planning: Patterns of Process Design and Effectiveness,\” Information & Management (42:5), pp 761–779. UserName - DateTime: sii-4/4/2017 6:12:04 PM)), productivity ([Shang and Seddon 2007](15031-0943-FullBook.docx" \l "Ref_1288_FILE150310943P3018" \o "(AutoLink):Shang, S., and Seddon, P.B. 2007. \“Managing Process Deficiencies with Enterprise Systems,\” Business Process Management Journal (13:3), pp 405–416. UserName - DateTime: sii-4/4/2017 6:12:34 PM)) and its stability ([Sedera et al. 2016](15031-0943-FullBook.docx" \l "Ref_1287_FILE150310943P3018" \o "(AutoLink):Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. \“Innovating with Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,\” Information & Management (53:3), pp 366–379. UserName - DateTime: sii-4/4/2017 6:12:32 PM)). It is also argued that ES provide a standardized technology platform ([Gawer 2009](15031-0943-FullBook.docx" \l "Ref_1245_FILE150310943P3018" \o "(AutoLink):Gawer, A. 2009. Platforms, Markets, and Innovation. Gloucestershire, UK: Edward Elgar Publishing. UserName - DateTime: sii-4/4/2017 6:12:00 PM)) that allows collaboration of multiple functional units such as accounting, warehousing and production planning and collaborators ([Kraemmerand et al. 2003](15031-0943-FullBook.docx" \l "Ref_1258_FILE150310943P3018" \o "(AutoLink):Kraemmerand, P., Møller, C., and Boer, H. 2003. \“ERP Implementation: An Integrated Process of Radical Change and Continuous Learning,\” Production Planning & Control (14:4), pp 338–348. UserName - DateTime: sii-4/4/2017 6:12:12 PM)), which facilitate innovation. However, the common view is that the ES is inherently rigid and complex, therefore it hinders the innovation capabilities of an organization ([Kharabe et al. 2013](15031-0943-FullBook.docx" \l "Ref_1255_FILE150310943P3018" \o "(AutoLink):Kharabe, A., Lyytinen, K., and Grover, V. 2013. \“Do Organizational Competencies Influence How Enterprise Systems Foster Organizational Agility?,\” in: International Conference On Information Systems (ICIS 2013). Milan, Italy. UserName - DateTime: sii-4/4/2017 6:12:09 PM); [Kharabe and Lyytinen 2012](15031-0943-FullBook.docx" \l "Ref_1256_FILE150310943P3018" \o "(AutoLink):Kharabe, A., and Lyytinen, K.J. 2012. \“Is Implementing ERP Like Pouring Concrete into a Company? Impact of Enterprise Systems on Organizational Agility,\” in: Thirty Third International Conference on Information Systems (ICIS 2012). Orlando UserName - DateTime: sii-4/4/2017 6:12:10 PM)). For example, high resource intensiveness ([Murphy and Simon 2002](15031-0943-FullBook.docx" \l "Ref_1274_FILE150310943P3018" \o "(AutoLink):Murphy, K.E., and Simon, S.J. 2002. \“Intangible Benefits Valuation in ERP Projects,\” Information Systems Journal (12:4), October 01, 2002, pp 301–320. UserName - DateTime: sii-4/4/2017 6:12:22 PM)), skill shortage ([Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:36 PM)), diffusion complexities ([Gable et al. 2008](15031-0943-FullBook.docx" \l "Ref_1244_FILE150310943P3018" \o "(ManLink):Gable, G.G., Sedera, D., and Chan, T. 2008. \“Re-Conceptualizing Information System Success: The IS-Impact Measurement Model,\” Journal of the Association for Information Systems (9:7), pp 377–408. UserName - DateTime: vge-4/5/2017 12:08:05 PM); [Gorla et al. 2010](15031-0943-FullBook.docx" \l "Ref_1248_FILE150310943P3018" \o "(AutoLink):Gorla, N., Somers, T.M., and Wong, B. 2010. \“Organizational Impact of System Quality, Information Quality, and Service Quality,\” The Journal of Strategic Information Systems (19:3), pp 207–228. UserName - DateTime: sii-4/4/2017 6:12:03 PM)) and steep organizational learning requirements ([Gorla et al. 2010](15031-0943-FullBook.docx" \l "Ref_1248_FILE150310943P3018" \o "(AutoLink):Gorla, N., Somers, T.M., and Wong, B. 2010. \“Organizational Impact of System Quality, Information Quality, and Service Quality,\” The Journal of Strategic Information Systems (19:3), pp 207–228. UserName - DateTime: sii-4/4/2017 6:12:03 PM); [Saraf et al. 2013](15031-0943-FullBook.docx" \l "Ref_1281_FILE150310943P3018" \o "(AutoLink):Saraf, N., Liang, H., Xue, Y., and Hu, Q. 2013. \“How Does Organisational Absorptive Capacity Matter in the Assimilation of Enterprise Information Systems?,\” Information Systems Journal (23:3), pp 245–267. UserName - DateTime: sii-4/4/2017 6:12:27 PM)) have been shown to restrict the ability of ES to enable innovation. Furthermore, some researchers criticize ES for lacking flexibility ([Kharabe et al. 2013](15031-0943-FullBook.docx" \l "Ref_1255_FILE150310943P3018" \o "(AutoLink):Kharabe, A., Lyytinen, K., and Grover, V. 2013. \“Do Organizational Competencies Influence How Enterprise Systems Foster Organizational Agility?,\” in: International Conference On Information Systems (ICIS 2013). Milan, Italy. UserName - DateTime: sii-4/4/2017 6:12:09 PM); [Kharabe and Lyytinen 2012](15031-0943-FullBook.docx" \l "Ref_1256_FILE150310943P3018" \o "(AutoLink):Kharabe, A., and Lyytinen, K.J. 2012. \“Is Implementing ERP Like Pouring Concrete into a Company? Impact of Enterprise Systems on Organizational Agility,\” in: Thirty Third International Conference on Information Systems (ICIS 2012). Orlando UserName - DateTime: sii-4/4/2017 6:12:10 PM)) and lacking long-term value propositions for life cycle–wide innovation ([Kemp and Low 2008](15031-0943-FullBook.docx" \l "Ref_1254_FILE150310943P3018" \o "(AutoLink):Kemp, M., and Low, G. 2008. \“ERP Innovation Implementation Model Incorporating Change Management,\” Business Process Management Journal (14:2), pp 228–242. UserName - DateTime: sii-4/4/2017 6:12:08 PM); [McAfee and Brynjolfsson 2008](15031-0943-FullBook.docx" \l "Ref_1272_FILE150310943P3018" \o "(AutoLink):McAfee, A., and Brynjolfsson, E. 2008. \“Investing in the IT That Makes a Competitive Difference,\” Harvard Business Review (86:7/8), pp 98–107. UserName - DateTime: sii-4/4/2017 6:12:21 PM)).

At the same time, anecdotal commentary suggests that organizations are innovating with low-cost, flexible and easy-to-access technologies such as cloud computing, mobile, wearables and social media. In this chapter, we refer to these technologies as digital technologies to distinguish the role of ES in facilitating innovation in the IT portfolio. Organizations that utilize digital technologies for innovation have shown much resilience to the changes in the environment and hyper-competition and have demonstrated better connectedness with their business partners ([Nylén and Holmström 2015](15031-0943-FullBook.docx" \l "Ref_1276_FILE150310943P3018" \o "(AutoLink):Nylén, D., and Holmström, J. 2015. \“Digital Innovation Strategy: A Framework for Diagnosing and Improving Digital Product and Service Innovation,\” Business Horizons (58:1), pp 57–67. UserName - DateTime: sii-4/4/2017 6:12:24 PM)). The availability of these digital technologies has raised new innovation possibilities for new and traditional organizations ([Avedillo et al. 2015](15031-0943-FullBook.docx" \l "Ref_1224_FILE150310943P3018" \o "(AutoLink):Avedillo, J.G., Begonha, D., and Peyracchia, A. 2015. \“Two Ways to Modernize IT Systems for the Digital Era,\” in: Insights & Publications. www.mckinsey.com/: McKinsey & Company. UserName - DateTime: sii-4/4/2017 6:11:45 PM); [Yoo et al. 2012](15031-0943-FullBook.docx" \l "Ref_1302_FILE150310943P3018" \o "(AutoLink):Yoo, Y., Boland Jr, R.J., Lyytinen, K., and Majchrzak, A. 2012. \“Organizing for Innovation in the Digitized World,\” Organization Science (23:5), pp 1398–1408. UserName - DateTime: sii-4/4/2017 6:12:44 PM)). While the ‘green-field’ organizations can think of technologies ‘from scratch,’ such options are not available for the incumbent traditional organizations ([Avedillo et al. 2015](15031-0943-FullBook.docx" \l "Ref_1224_FILE150310943P3018" \o "(AutoLink):Avedillo, J.G., Begonha, D., and Peyracchia, A. 2015. \“Two Ways to Modernize IT Systems for the Digital Era,\” in: Insights & Publications. www.mckinsey.com/: McKinsey & Company. UserName - DateTime: sii-4/4/2017 6:11:45 PM)). Further, for many organizations, an ES is critical for existing operations and also represents the largest single IT investment ([Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:36 PM)). As such, the traditional organizations must see new ways of combining the digital technologies with their ES. The dipolar nature of digital technologies and the existing ES present a challenge to create a consistent and productive IT portfolio that facilitates innovation. Management consultants call this phenomenon of managing new and old technologies in a single IT portfolio a ‘two-speed IT system,’ highlighting the distinct nature of the two types of systems.[[1]](#endnote-1) [Figure 18.1](#_S26_FgC_figure___1) depicts the characteristics of the legacy ES and digital technologies. [Figure 18.1](#_S26_FgC_figure___1) also highlights that astute organizations can employ the IT portfolio in which the capabilities of each type of system are matched with weaknesses of other types of systems to create portfolio strategies that provide value to the organization.

The objective of this chapter is to raise a discussion about the changing role of ES in innovation in these dynamic and hyper-competitive times. There is growing consensus among the academics (e.g., [Carlo et al. 2014](15031-0943-FullBook.docx" \l "Ref_1230_FILE150310943P3018" \o "(AutoLink):Carlo, J.L., Gaskin, J., Lyytinen, K., and Rose, G.M. 2014. \“Early Vs. Late Adoption of Radical Information Technology Innovations across Software Development Organizations: An Extension of the Disruptive Information Technology Innovation Model,\” Information Systems Journal (24:3). UserName - DateTime: sii-4/4/2017 6:11:50 PM)) and practitioners (e.g., [PwC 2012](15031-0943-FullBook.docx" \l "Ref_1277_FILE150310943P3018" \o "(AutoLink):PwC. 2012. \“How to Drive Innovation and Business Growth: Leveraging Emerging Technology for Sustainable Growth,\” www.pwc.com/en_US/us/supply-chain-management/assets/pwc-oracle-innovation-white-paper.pdf. UserName - DateTime: sii-4/4/2017 6:12:24 PM)) that radical innovations facilitated by enterprise systems are too costly to the organization ([Benner and Tushman 2003](15031-0943-FullBook.docx" \l "Ref_1226_FILE150310943P3018" \o "(AutoLink):Benner, M.J., and Tushman, M.L. 2003. \“Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited,\” Academy of Management Review (28:2), pp 238–256. UserName - DateTime: sii-4/4/2017 6:11:47 PM)). Similarly, there are equally compelling arguments that incremental innovations of ES may not suit the current dynamic environment ([Chang et al. 2014](15031-0943-FullBook.docx" \l "Ref_1234_FILE150310943P3018" \o "(AutoLink):Chang, W., Franke, G.R., Butler, T.D., Musgrove, C.F., and Ellinger, A.E. 2014. \“Differential Mediating Effects of Radical and Incremental Innovation on Market Orientation-Performance Relationship: A Meta-Analysis,\” Journal of Marketing Theory and Practice (22:3), pp 235–250. UserName - DateTime: sii-4/4/2017 6:11:54 PM)). Moreover, there is potential for the organizations to amalgamate digital technologies with the enterprise system to create better innovation potentials.

<Insert [Figure 18.1](#_S22_FgC_figure___18__1) Here>

Figure 18.1 Comparison of enterprise systems and digital technologies

A quick word on innovation

The “importance of innovation to organizational competitiveness” has been acknowledged for decades by many scholars ([Wolfe 1994](15031-0943-FullBook.docx" \l "Ref_1301_FILE150310943P3018" \o "(AutoLink):Wolfe, R.A. 1994. \“Organizational Innovation: Review, Critique and Suggested Research Directions,\” The Journal of Management Studies (31:3), pp 405–431. UserName - DateTime: sii-4/4/2017 6:12:42 PM), p. 405). According to Schumpeterian creative destruction, organizations that are less adaptive to changes in the dynamic environment are less likely to survive ([Abrell et al. 2016](15031-0943-FullBook.docx" \l "Ref_1223_FILE150310943P3018" \o "(AutoLink):Abrell, T., Pihlajamaa, M., Kanto, L., vom Brocke, J., and Uebernickel, F. 2016. \“The Role of Users and Customers in Digital Innovation: Insights from B2b Manufacturing Firms,\” Information & Management (53:3), pp 324–335. UserName - DateTime: sii-4/4/2017 6:11:43 PM); [Tushman and Anderson 1986](15031-0943-FullBook.docx" \l "Ref_1297_FILE150310943P3018" \o "(AutoLink):Tushman, M.L., and Anderson, P. 1986. \“Technological Discontinuities and Organizational Environments,\” Administrative Science Quarterly (31:3), pp 439–465. UserName - DateTime: sii-4/4/2017 6:12:40 PM)). As such, for the survival in the contemporary competitive world, innovation has become a necessity ([Leifer et al. 2000](15031-0943-FullBook.docx" \l "Ref_1261_FILE150310943P3018" \o "(AutoLink):Leifer, R., McDermott, C.M., G., C.-O.C., Peters, L.S., Rice, M.P., and Veryzer, R.W. 2000. Radical Innovation: How Mature Companies Can Outsmart Upstairs. Boston, MA: Harvard Business School Press. UserName - DateTime: sii-4/4/2017 6:12:15 PM); [Lewis et al. 2002](15031-0943-FullBook.docx" \l "Ref_1262_FILE150310943P3018" \o "(AutoLink):Lewis, M.W., Welsh, M.A., Dehler, G.E., and Green, S.G. 2002. \“Product Development Tensions: Exploring Contrasting Styles of Project Management,\” Academy of Management Journal (45:3), pp 546–564. UserName - DateTime: sii-4/4/2017 6:12:16 PM); [Utterback 1994](15031-0943-FullBook.docx" \l "Ref_1298_FILE150310943P3018" \o "(AutoLink):Utterback, J.M. 1994. Mastering the Dynamics of Innovation. Boston, MA: Harvard Business School Press. UserName - DateTime: sii-4/4/2017 6:12:40 PM)). Innovation in this book chapter is defined as any idea, practice or material artefact perceived to be new by the relevant unit of adoption ([Zaltman et al. 1977](15031-0943-FullBook.docx" \l "Ref_1304_FILE150310943P3018" \o "(AutoLink):Zaltman, G., Duncan, R., and Holbek, J. 1977. Innovations and Organizations. New York: John Wiley & Sons. UserName - DateTime: sii-4/4/2017 6:12:46 PM)). This definition takes into account any idea, artifact or any practice that is not new to the world, but new to the organization that adopts it. As [Nambisan (2013](15031-0943-FullBook.docx" \l "Ref_1275_FILE150310943P3018" \o "(AutoLink):Nambisan, S. 2013. \“Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research,\” Journal of the Association for Information Systems (14:4), pp 215–226. UserName - DateTime: sii-4/4/2017 6:12:22 PM), p. 216) says,

in the last one decade or so, the nature of innovation has undergone considerable change in most industries. Innovation has become much more open, global, and collaborative in nature to involve a diverse network of partners and emphasizing distributed innovation processes.

Further, [Yoo et al. (2012](15031-0943-FullBook.docx" \l "Ref_1302_FILE150310943P3018" \o "(AutoLink):Yoo, Y., Boland Jr, R.J., Lyytinen, K., and Majchrzak, A. 2012. \“Organizing for Innovation in the Digitized World,\” Organization Science (23:5), pp 1398–1408. UserName - DateTime: sii-4/4/2017 6:12:44 PM), p. 1400) argue that the process of innovation itself has shifted dramatically in recent times owing to the “open, flexible affordances of . . . digital technology,” thereby requiring separate investigation.

The role of ES in innovation

Information systems scholars have recognized ES as a strong enabler of innovation ([Seddon et al. 2010](15031-0943-FullBook.docx" \l "Ref_1284_FILE150310943P3018" \o "(AutoLink):Seddon, P.B., Calvert, C., and Yang, S. 2010. \“A Multi-Project Model of Key Factors Affecting Organizational Benefits from Enterprise Systems,\” MIS Quarterly (34:2), pp 305–328. UserName - DateTime: sii-4/4/2017 6:12:30 PM); [Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:36 PM); [Van den Bergh and Viaene 2013](15031-0943-FullBook.docx" \l "Ref_1299_FILE150310943P3018" \o "(AutoLink):Van den Bergh, J., and Viaene, S. 2013. \“Process Innovation: Redesigning an Enterprise Backbone System,\” in: Enterprise Information Systems of the Future. Springer, pp. 1–17. UserName - DateTime: sii-4/4/2017 6:12:41 PM)). According to Allied Market Research, the ES market size is predicted to reach $41.69 billion by 2020, with key players like SAP AG, Oracle Corp. and Microsoft noted as the leading vendors. An enterprise system provides a modular suite of software that allows an organization to run its core business processes. Enterprise systems epitomize features such as process integration, process orientation, process standardization and real-time information ([Seddon et al. 2010](15031-0943-FullBook.docx" \l "Ref_1284_FILE150310943P3018" \o "(AutoLink):Seddon, P.B., Calvert, C., and Yang, S. 2010. \“A Multi-Project Model of Key Factors Affecting Organizational Benefits from Enterprise Systems,\” MIS Quarterly (34:2), pp 305–328. UserName - DateTime: sii-4/4/2017 6:12:30 PM)). According to Panorama Consulting Solutions, a typical average enterprise systems implementation time for mid-sized organization is 14 months and implementation costs could start at several million dollars. Organizations have justified the lengthy implementation times and costs, considering the innate characteristics of integration, real-time information flows and standardization. There is also evidence that ES has enabled organizations to innovate by offering increased knowledge capabilities ([Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:36 PM)). These packaged ES applications provide benefits such as better corporate governance, consistent and real-time information, and stable and flexible platforms ([Davenport 2000b](15031-0943-FullBook.docx" \l "Ref_1238_FILE150310943P3018" \o "(AutoLink):Davenport, T.H. 2000b. Mission Critical: Realizing the Promise of Enterprise Systems. Harvard Business Press. UserName - DateTime: sii-4/4/2017 6:11:56 PM); [Gable et al. 2008](15031-0943-FullBook.docx" \l "Ref_1244_FILE150310943P3018" \o "(ManLink):Gable, G.G., Sedera, D., and Chan, T. 2008. \“Re-Conceptualizing Information System Success: The IS-Impact Measurement Model,\” Journal of the Association for Information Systems (9:7), pp 377–408. UserName - DateTime: vge-4/5/2017 12:08:13 PM); [Seddon et al. 2010](15031-0943-FullBook.docx" \l "Ref_1284_FILE150310943P3018" \o "(AutoLink):Seddon, P.B., Calvert, C., and Yang, S. 2010. \“A Multi-Project Model of Key Factors Affecting Organizational Benefits from Enterprise Systems,\” MIS Quarterly (34:2), pp 305–328. UserName - DateTime: sii-4/4/2017 6:12:30 PM); [Sedera and Gable 2010](15031-0943-FullBook.docx" \l "Ref_1286_FILE150310943P3018" \o "(AutoLink):Sedera, D., and Gable, G.G. 2010. \“Knowledge Management Competence for Enterprise System Success,\” The Journal of Strategic Information Systems (19:4), pp 296–306. UserName - DateTime: sii-4/4/2017 6:12:31 PM)). Furthermore, the implementation of the ES to an organization is often characterized as a radical change to business processes ([Bingi et al. 1999](15031-0943-FullBook.docx" \l "Ref_1227_FILE150310943P3018" \o "(AutoLink):Bingi, P., Sharma, M.K., and Godla, J.K. 1999. \“Critical Issues Affecting an ERP Implementation,\” Information Systems Management (16:3), pp 7–14. UserName - DateTime: sii-4/4/2017 6:11:48 PM); [Kraemmerand et al. 2003](15031-0943-FullBook.docx" \l "Ref_1258_FILE150310943P3018" \o "(AutoLink):Kraemmerand, P., Møller, C., and Boer, H. 2003. \“ERP Implementation: An Integrated Process of Radical Change and Continuous Learning,\” Production Planning & Control (14:4), pp 338–348. UserName - DateTime: sii-4/4/2017 6:12:12 PM)) and management structures ([Sasidharan et al. 2012](15031-0943-FullBook.docx" \l "Ref_1282_FILE150310943P3018" \o "(AutoLink):Sasidharan, S., Santhanam, R., Brass, D.J., and Sambamurthy, V. 2012. \“The Effects of Social Network Structure on Enterprise Systems Success: A Longitudinal Multilevel Analysis,\” Information Systems Research (23:3/1/2), pp 658–678. UserName - DateTime: sii-4/4/2017 6:12:28 PM)). However, due to its high resource intensiveness, there is a continuous debate on the long-term innovation value propositions of ES ([Davenport 2000a](15031-0943-FullBook.docx" \l "Ref_1237_FILE150310943P3018" \o "(ManLink):Davenport, T.H. 2000a. \“The Future of Enterprise System-Enabled Organizations,\” Information Systems Frontiers (2:2), pp 163–180. UserName - DateTime: vge-4/5/2017 12:08:20 PM); [Davenport et al. 2004](15031-0943-FullBook.docx" \l "Ref_1240_FILE150310943P3018" \o "(AutoLink):Davenport, T.H., Harris, J.G., and Cantrell, S. 2004. \“Enterprise Systems and Ongoing Process Change,\” Business Process Management Journal (10:1), pp 16–26. UserName - DateTime: sii-4/4/2017 6:11:57 PM); [Dutta et al. 2014](15031-0943-FullBook.docx" \l "Ref_1241_FILE150310943P3018" \o "(AutoLink):Dutta, A., Lee, H., and Yasai-Ardekani, M. 2014. \“Digital Systems and Competitive Responsiveness: The Dynamics of IT Business Value,\” Information & Management (51:6), pp 762–773. UserName - DateTime: sii-4/4/2017 6:11:58 PM); [Kemp and Low 2008](15031-0943-FullBook.docx" \l "Ref_1254_FILE150310943P3018" \o "(AutoLink):Kemp, M., and Low, G. 2008. \“ERP Innovation Implementation Model Incorporating Change Management,\” Business Process Management Journal (14:2), pp 228–242. UserName - DateTime: sii-4/4/2017 6:12:08 PM); [McAfee and Brynjolfsson 2008](15031-0943-FullBook.docx" \l "Ref_1272_FILE150310943P3018" \o "(AutoLink):McAfee, A., and Brynjolfsson, E. 2008. \“Investing in the IT That Makes a Competitive Difference,\” Harvard Business Review (86:7/8), pp 98–107. UserName - DateTime: sii-4/4/2017 6:12:21 PM)).

The ability and the newness of the information systems deteriorate over time, and as a result, for the survival of the organizations these systems must be upgraded or replaced ([Swanson and Dans 2000](15031-0943-FullBook.docx" \l "Ref_1293_FILE150310943P3018" \o "(ManLink):Swanson, E.B., and Dans, E. 2000. \“System Life Expectancy and the Maintenance Effort: Exploring Their Equilibration,\” MIS Quarterly (24:2), pp 277–297. UserName - DateTime: vge-4/5/2017 12:08:27 PM)). Enterprise systems too face the same problem in losing their innovation value propositions over time. However, ES are rarely replaced ([Eden et al. 2014](15031-0943-FullBook.docx" \l "Ref_1242_FILE150310943P3018" \o "(AutoLink):Eden, R., Sedera, D., and Tan, F. 2014. \“Sustaining the Momentum: Archival Analysis of Enterprise Resource Planning Systems (2006–2012),\” Communications of the Association for Information Systems (35:3), pp 39–82. UserName - DateTime: sii-4/4/2017 6:11:59 PM)), highlighting the need for organizations to innovate using their existing ES. Many organizations using ES rely upon the software vendor for life cycle–wide innovations through upgrades and launch of new products ([Chua and Khoo 2011](15031-0943-FullBook.docx" \l "Ref_1235_FILE150310943P3018" \o "(AutoLink):Chua, C.E.H., and Khoo, H.M. 2011. \“How Organizations Motivate Users to Participate in Support Upgrades of Customized Packaged Software,\” Information & Management (48:8), pp 328–335. UserName - DateTime: sii-4/4/2017 6:11:55 PM)). However, factors like the complexity of upgrades, resource constraints and tiresome continuous change management initiatives have dulled the appetite for organizations to engage in regular software upgrades – therefore compromising the innovation potential. Moreover, the exclusive innovation potential of ES diminishes over time. Research on ES use (e.g., [Burton-Jones and Grange 2012](15031-0943-FullBook.docx" \l "Ref_1229_FILE150310943P3018" \o "(AutoLink):Burton-Jones, A., and Grange, C. 2012. \“From Use to Effective Use: A Representation Theory Perspective,\” Information Systems Research (24:3), pp 632–658. UserName - DateTime: sii-4/4/2017 6:11:49 PM); [McLean and Sedera 2010](15031-0943-FullBook.docx" \l "Ref_1273_FILE150310943P3018" \o "(ManLink):McLean, E., and Sedera, D. 2010. \“The Measurement of Information System Use: Preliminary Considerations,\” Americas Conference on Information Systems (AMCIS), Leema, Peru: AIS. UserName - DateTime: vge-4/5/2017 12:08:34 PM)) and ES benefits (e.g., [Seddon et al. 2010](15031-0943-FullBook.docx" \l "Ref_1284_FILE150310943P3018" \o "(AutoLink):Seddon, P.B., Calvert, C., and Yang, S. 2010. \“A Multi-Project Model of Key Factors Affecting Organizational Benefits from Enterprise Systems,\” MIS Quarterly (34:2), pp 305–328. UserName - DateTime: sii-4/4/2017 6:12:30 PM)) allude to the necessity for continuously finding new ways of using the ES to facilitate innovation. The aforementioned facets relating to enterprise systems place a growing pressure on organizations, vendors and implementation partners to deliver better solutions, models and approaches that facilitates life cycle–wide innovation ([Esteves 2009](15031-0943-FullBook.docx" \l "Ref_1243_FILE150310943P3018" \o "(AutoLink):Esteves, J. 2009. \“A Benefits Realisation Road-Map Framework for ERP Usage in Small and Medium-Sized Enterprises,\” Journal of Enterprise Information Management (22:1/2), pp 25–35. UserName - DateTime: sii-4/4/2017 6:12:00 PM); [Lokuge and Sedera 2014b](15031-0943-FullBook.docx" \l "Ref_1265_FILE150310943P3018" \o "(AutoLink):Lokuge, S., and Sedera, D. 2014b. \“Enterprise Systems Lifecycle-Wide Innovation,\” Americas Conference on Information Systems (AMCIS 2014), Savannah, Georgia: AIS Library. UserName - DateTime: sii-4/4/2017 6:12:18 PM); [Lokuge and Sedera 2014c](15031-0943-FullBook.docx" \l "Ref_1266_FILE150310943P3018" \o "(AutoLink):Lokuge, S., and Sedera, D. 2014c. \“Enterprise Systems Lifecycle-Wide Innovation Readiness,\” Pacific Asia Conference on Information Systems (PACIS 2014), Chengdu, China: AIS Library. UserName - DateTime: sii-4/4/2017 6:12:18 PM)).

However, ES are inherently considered less flexible systems ([Kharabe and Lyytinen 2012](15031-0943-FullBook.docx" \l "Ref_1256_FILE150310943P3018" \o "(AutoLink):Kharabe, A., and Lyytinen, K.J. 2012. \“Is Implementing ERP Like Pouring Concrete into a Company? Impact of Enterprise Systems on Organizational Agility,\” in: Thirty Third International Conference on Information Systems (ICIS 2012). Orlando UserName - DateTime: sii-4/4/2017 6:12:10 PM)). For example, ES was considered ‘liquid concrete,’ highlighting its inflexibility ([Lokuge 2015](15031-0943-FullBook.docx" \l "Ref_1263_FILE150310943P3018" \o "(AutoLink):Lokuge, K.S.P. 2015. \“Agile Innovation: Innovating with Enterprise Systems.\” Queensland University of Technology. UserName - DateTime: sii-4/4/2017 6:12:17 PM); [Lokuge and Sedera 2014a](15031-0943-FullBook.docx" \l "Ref_1264_FILE150310943P3018" \o "(ManLink):Lokuge, S., and Sedera, D. 2014a. \“Deriving Information Systems Innovation Execution Mechanisms,\” Australasian Conference on Information Systems (ACIS 2014), Auckland, New Zealand: AIS Library. UserName - DateTime: vge-4/5/2017 12:08:40 PM); *[Economist](15031-0943-FullBook.docx" \l "Ref_1295_FILE150310943P3018" \o "(AutoLink):The Economist. 2007. \“Liquid Concrete: As Software Shifts to an \“on Demand\” Model, Can SAP Move with the Times?,\” in: The Economist. www.economist.com. UserName - DateTime: sii-4/4/2017 6:12:38 PM)* [2007](15031-0943-FullBook.docx" \l "Ref_1295_FILE150310943P3018" \o "(AutoLink):The Economist. 2007. \“Liquid Concrete: As Software Shifts to an \“on Demand\” Model, Can SAP Move with the Times?,\” in: The Economist. www.economist.com. UserName - DateTime: sii-4/4/2017 6:12:38 PM)). Anecdotal commentary suggests that company’s reliance on the software vendor for its innovations creates an over-dependency. Such over-dependencies on the software vendor for innovations not only takes away the innovation spirit of the organization, but it also dampens the unique solution for individual strategic advantage ([Kumar and van Hillegersberg 2000](15031-0943-FullBook.docx" \l "Ref_1259_FILE150310943P3018" \o "(AutoLink):Kumar, K., and van Hillegersberg, J. 2000. \“ERP Experiences and Evolution,\” Communications of the ACM (43:4), Apr 2000, pp 22–26. UserName - DateTime: sii-4/4/2017 6:12:13 PM); [Kumar et al. 2003](15031-0943-FullBook.docx" \l "Ref_1260_FILE150310943P3018" \o "(AutoLink):Kumar, V., Maheshwari, B., and Kumar, U. 2003. \“An Investigation of Critical Management Issues in ERP Implementation: Empirical Evidence from Canadian Organizations,\” Technovation (23:10), pp 793–807. UserName - DateTime: sii-4/4/2017 6:12:14 PM)). Moreover, obtaining appropriate enterprise systems skills still remains one of the challenging tasks for the organization. The appropriate skills shortage is visible at all levels of the organization; technical, management and operational. Not having the right skills is a major barrier for innovations ([Jansen et al. 2006](15031-0943-FullBook.docx" \l "Ref_1251_FILE150310943P3018" \o "(AutoLink):Jansen, J.J.P., Van Den Bosch, F.A.J., and Volberda, H.W. 2006. \“Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators,\” Management Science (52:11), pp 1661–1674. UserName - DateTime: sii-4/4/2017 6:12:06 PM)). Considering the challenges that organizations face, enterprise systems vendors now promote open architectures for wider participation of third-party vendors and skills, thus expanding innovation opportunities. Such open technologies have eliminated some of the inflexible architectures and have enhanced openness of enterprise systems ([Ceccagnoli et al. 2012](15031-0943-FullBook.docx" \l "Ref_1232_FILE150310943P3018" \o "(AutoLink):Ceccagnoli, M., Forman, C., Huang, P., and Wu, D. 2012. \“Cocreation of Value in a Platform Ecosystem: The Case of Enterprise Software,\” MIS Quarterly (36:1), pp 263–290. UserName - DateTime: sii-4/4/2017 6:11:52 PM)). Therefore, ES are now taking a more salient role as a technology platform ([Gawer and Cusumano 2012](15031-0943-FullBook.docx" \l "Ref_1246_FILE150310943P3018" \o "(AutoLink):Gawer, A., and Cusumano, M.A. 2012. \“How Companies Become Platform Leaders,\” MIT Sloan Management Review (49:2), pp 28–35. UserName - DateTime: sii-4/4/2017 6:12:01 PM); [Schenk 2015](15031-0943-FullBook.docx" \l "Ref_1283_FILE150310943P3018" \o "(AutoLink):Schenk, B. 2015. \“The Role of Enterprise Systems in Process Innovation,\” in: Bpm-Driving Innovation in a Digital World, J.v. Brocke and T. Schmiedel (eds.). Switzerland: Springer, pp. 75–84. UserName - DateTime: sii-4/4/2017 6:12:28 PM)). The advanced role of ES as a technology platform is providing an ecosystem of independent software vendors to integrate with the ES, facilitating organizations to innovate ([Ceccagnoli et al. 2012](15031-0943-FullBook.docx" \l "Ref_1232_FILE150310943P3018" \o "(AutoLink):Ceccagnoli, M., Forman, C., Huang, P., and Wu, D. 2012. \“Cocreation of Value in a Platform Ecosystem: The Case of Enterprise Software,\” MIS Quarterly (36:1), pp 263–290. UserName - DateTime: sii-4/4/2017 6:11:52 PM); [Lokuge and Sedera 2016](15031-0943-FullBook.docx" \l "Ref_1267_FILE150310943P3018" \o "(AutoLink):Lokuge, S., and Sedera, D. 2016. \“Is Your IT Eco-System Ready to Facilitate Organizational Innovation? Deriving an IT Eco-System Readiness Measurement Model,\” The International Conference on Information Systems (ICIS2016), Dublin, Ireland: AIS. UserName - DateTime: sii-4/4/2017 6:12:19 PM)).

The digital technologies join the IT portfolio

The advent of digital technologies such as cloud computing, wearables, mobile technology, social media and business analytics are said to provide unprecedented opportunities to all organizations in the world. These technologies are easily accessible ([Nylén and Holmström 2015](15031-0943-FullBook.docx" \l "Ref_1276_FILE150310943P3018" \o "(AutoLink):Nylén, D., and Holmström, J. 2015. \“Digital Innovation Strategy: A Framework for Diagnosing and Improving Digital Product and Service Innovation,\” Business Horizons (58:1), pp 57–67. UserName - DateTime: sii-4/4/2017 6:12:24 PM)), easily maintainable ([Chakravarty et al. 2013](15031-0943-FullBook.docx" \l "Ref_1233_FILE150310943P3018" \o "(AutoLink):Chakravarty, A., Grewal, R., and Sambamurthy, V. 2013. \“Information Technology Competencies, Organizational Agility, and Firm Performance: Enabling and Facilitating Roles,\” Information Systems Research (24:4), pp 976–997. UserName - DateTime: sii-4/4/2017 6:11:53 PM)), can be easily integrated with other technologies ([Rai and Tang 2010](15031-0943-FullBook.docx" \l "Ref_1278_FILE150310943P3018" \o "(ManLink):Rai, A., and Tang, X. 2010. \“Leveraging IT Capabilities and Competitive Process Capabilities for the Management of Interorganizational Relationship Portfolios,\” Information Systems Research (21:3), pp 516–570. UserName - DateTime: vge-4/5/2017 12:08:48 PM)), are flexible ([Nambisan 2013](15031-0943-FullBook.docx" \l "Ref_1275_FILE150310943P3018" \o "(AutoLink):Nambisan, S. 2013. \“Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research,\” Journal of the Association for Information Systems (14:4), pp 215–226. UserName - DateTime: sii-4/4/2017 6:12:22 PM)), have a low information processing capability ([Nylén and Holmström 2015](15031-0943-FullBook.docx" \l "Ref_1276_FILE150310943P3018" \o "(AutoLink):Nylén, D., and Holmström, J. 2015. \“Digital Innovation Strategy: A Framework for Diagnosing and Improving Digital Product and Service Innovation,\” Business Horizons (58:1), pp 57–67. UserName - DateTime: sii-4/4/2017 6:12:24 PM)) and enable reusability ([Yoo et al. 2012](15031-0943-FullBook.docx" \l "Ref_1302_FILE150310943P3018" \o "(AutoLink):Yoo, Y., Boland Jr, R.J., Lyytinen, K., and Majchrzak, A. 2012. \“Organizing for Innovation in the Digitized World,\” Organization Science (23:5), pp 1398–1408. UserName - DateTime: sii-4/4/2017 6:12:44 PM); [Yoo et al. 2010](15031-0943-FullBook.docx" \l "Ref_1303_FILE150310943P3018" \o "(AutoLink):Yoo, Y., Henfridsson, O., and Lyytinen, K. 2010. \“The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research,\” Information Systems Research (21:4), pp 724–735. UserName - DateTime: sii-4/4/2017 6:12:45 PM)). The ease of use of these technologies has increased the participation of the users in innovation activities ([Nylén and Holmström 2015](15031-0943-FullBook.docx" \l "Ref_1276_FILE150310943P3018" \o "(AutoLink):Nylén, D., and Holmström, J. 2015. \“Digital Innovation Strategy: A Framework for Diagnosing and Improving Digital Product and Service Innovation,\” Business Horizons (58:1), pp 57–67. UserName - DateTime: sii-4/4/2017 6:12:24 PM); [Zittrain 2006](15031-0943-FullBook.docx" \l "Ref_1305_FILE150310943P3018" \o "(AutoLink):Zittrain, J.L. 2006. \“The Generative Internet,\” Harvard Law Review (119:7), pp 1974–2040. UserName - DateTime: sii-4/4/2017 6:12:47 PM)). As such, the innate capabilities of digital technologies provide myriad ways to attain innovation in an organization.

The aforementioned positive affordances of digital technologies provide organizations an opportunity to engage in IT-led innovation with relatively low resource availability (e.g., finance and human capital). These technologies enable organizations with fewer resources to innovate and compete with large organizations in a similar manner ([Sedera et al. 2016](15031-0943-FullBook.docx" \l "Ref_1287_FILE150310943P3018" \o "(AutoLink):Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. \“Innovating with Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,\” Information & Management (53:3), pp 366–379. UserName - DateTime: sii-4/4/2017 6:12:32 PM)). Thus, researchers argue that the advent of digital technologies has disrupted the orthodox direct relationship with resource availability and organizational outcomes ([Lokuge and Sedera 2014a](15031-0943-FullBook.docx" \l "Ref_1264_FILE150310943P3018" \o "(ManLink):Lokuge, S., and Sedera, D. 2014a. \“Deriving Information Systems Innovation Execution Mechanisms,\” Australasian Conference on Information Systems (ACIS 2014), Auckland, New Zealand: AIS Library. UserName - DateTime: vge-4/5/2017 12:08:55 PM); [Sedera et al. 2016](15031-0943-FullBook.docx" \l "Ref_1287_FILE150310943P3018" \o "(AutoLink):Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. \“Innovating with Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,\” Information & Management (53:3), pp 366–379. UserName - DateTime: sii-4/4/2017 6:12:32 PM)). Furthermore, opportunities to apply these technologies have augmented due to the consumerization of IT, through which IT has become an accessible commodity to the general public to take part in innovations ([Carr 2003](15031-0943-FullBook.docx" \l "Ref_1231_FILE150310943P3018" \o "(AutoLink):Carr, N.G. 2003. \“IT Doesn’t Matter,\” Harvard Business Review (81:5), pp 41–49. UserName - DateTime: sii-4/4/2017 6:11:51 PM)). Researchers and practitioners accredit these factors to the birth and growth of organizations like Uber, Airbnb and Alibaba.com. Although the distinct characteristics of digital technologies, together with the consumerization of IT, have important practical and theoretical implications for organizations, these technologies need to be effectively integrated with existing technologies in the organization. The diverse nature of these technologies – digital technologies and existing technologies – presents a challenge to create a consistent and productive IT portfolio.

McKenzie consulting company calls this phenomenon of managing new and old technologies in a single IT portfolio ‘two-speed IT systems,’ highlighting the dipolar nature of the systems.[[2]](#endnote-2) They also highlight that astute organizations can employ the IT portfolio in which the capabilities of each type of system are matched with weaknesses of other types of systems to create portfolio strategies that provide value to the organization. On one side of the two-speed IT, the existing IT portfolio includes legacy systems, dominated by ES. Many scholars praise the capabilities of ES in providing operational flexibility, real-time information and transparency ([Seddon et al. 2010](15031-0943-FullBook.docx" \l "Ref_1284_FILE150310943P3018" \o "(AutoLink):Seddon, P.B., Calvert, C., and Yang, S. 2010. \“A Multi-Project Model of Key Factors Affecting Organizational Benefits from Enterprise Systems,\” MIS Quarterly (34:2), pp 305–328. UserName - DateTime: sii-4/4/2017 6:12:30 PM)). However, as mentioned earlier, high resource intensiveness, the need for continuous vendor-driven upgrades, skill shortages, diffusion complexities and steep organizational learning requirements have been shown to restrict the ability of ES-led legacy applications to innovate in the modern dynamic economies. In addition, some criticize ES for lacking flexibility and lacking long-term value propositions for life cycle–wide innovation.

On the other hand, since the mid-2000s, the advent of cloud computing, wearables, mobile technology, social media and business analytics has presented corporate IT with ‘fast-paced’ new technologies that have dramatically changed the nature of IT for achieving corporate goals. Fueled by the consumerization of IT, the ability to acquire, learn, deploy, use and manage these systems faster than traditional systems has made these technologies popular with organizations seeking rapid opportunities in the hyper-competitive global markets. In addition, these newer technologies go beyond the conventional boundaries of the traditional corporate IT ([Lokuge 2015](15031-0943-FullBook.docx" \l "Ref_1263_FILE150310943P3018" \o "(AutoLink):Lokuge, K.S.P. 2015. \“Agile Innovation: Innovating with Enterprise Systems.\” Queensland University of Technology. UserName - DateTime: sii-4/4/2017 6:12:17 PM)).

The challenge for an organization is not to endorse one type of system, but to strategically use both the existing systems (slow) and fast digital technologies in combination to create value. Furthermore, no organization has the appetite to dispose of the existing systems, especially ES. Therefore, the two types of systems with seemingly dipolar characteristics (as depicted in [Figure 18.1](#_S26_FgC_figure___1)) should be strategically amalgamated to derive true business value. Despite the purported opportunities presented to organizations to develop and employ an IT portfolio that is flexible, dynamic and effective, we see that only very few organizations are successful in changing their IT portfolio to achieve high organizational benefits, with most still struggling to assemble and manage their IT portfolio. Even though management consultants coined the term ‘two-speed IT architecture’ as a survival mantra for established firms, guidelines on how a two-speed IT portfolio is created are scant. Moreover, the era of two-speed IT is a novel experience, especially to the traditional ones. As such the existing management practices may not work effectively. Therefore, the deployment and management of a two-speed IT portfolio requires fundamental re-thinking.

Considerations for organizations

Having considered the historical and current state of ES, digital technologies and the universal need to innovate, this chapter now presents contextual factors for attaining innovation through a mix of IT in contemporary organizations. These considerations can be enacted as strategies. Then such considerations will lead organizations to innovate better.

Stabilize your enterprise system

The stability of the enterprise systems has been discussed in many academic and practitioner outlets ([Avedillo et al. 2015](15031-0943-FullBook.docx" \l "Ref_1224_FILE150310943P3018" \o "(AutoLink):Avedillo, J.G., Begonha, D., and Peyracchia, A. 2015. \“Two Ways to Modernize IT Systems for the Digital Era,\” in: Insights & Publications. www.mckinsey.com/: McKinsey & Company. UserName - DateTime: sii-4/4/2017 6:11:45 PM); [Sedera et al. 2016](15031-0943-FullBook.docx" \l "Ref_1287_FILE150310943P3018" \o "(AutoLink):Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. \“Innovating with Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,\” Information & Management (53:3), pp 366–379. UserName - DateTime: sii-4/4/2017 6:12:33 PM)). It is commonly agreed that an organization with an enterprise system would undergo a performance dip ([Ross and Vitale 2000](15031-0943-FullBook.docx" \l "Ref_1280_FILE150310943P3018" \o "(AutoLink):Ross, J.W., and Vitale, M.R. 2000. \“The ERP Revolution: Surviving Vs. Thriving,\” Information Systems Frontiers (2:2), pp 233–241. UserName - DateTime: sii-4/4/2017 6:12:26 PM)). Anecdotal commentary suggests that using an enterprise system is a complex phenomenon that impacts the organization in a multitude of ways. Academic studies have characterized the impact of ES in organizations demonstrating that organizations take time to train, learn and adopt the system. This process happens over long periods ([Kamhawi and Gunasekaran 2009](15031-0943-FullBook.docx" \l "Ref_1252_FILE150310943P3018" \o "(AutoLink):Kamhawi, E.M., and Gunasekaran, A. 2009. \“ERP Systems Implementation Success Factors: IS and Non-IS Managers’ Perceptions,\” International Journal of Business Information Systems (4:6), pp 688–704. UserName - DateTime: sii-4/4/2017 6:12:07 PM)). The journey with the enterprise systems for the organization with initially steep learning curves ([Botta-Genoulaz and Millet 2005](15031-0943-FullBook.docx" \l "Ref_1228_FILE150310943P3018" \o "(AutoLink):Botta-Genoulaz, V., and Millet, P.-A. 2005. \“A Classification for Better Use of ERP Systems,\” Computers in Industry (56:6), pp 573–587. UserName - DateTime: sii-4/4/2017 6:11:49 PM); [Mandal and Gunasekaran 2003](15031-0943-FullBook.docx" \l "Ref_1269_FILE150310943P3018" \o "(AutoLink):Mandal, P., and Gunasekaran, A. 2003. \“Issues in Implementing ERP: A Case Study,\” European Journal of Operational Research (146:2), pp 274–283. UserName - DateTime: sii-4/4/2017 6:12:20 PM)) when they first encounter the system and gradually master the use of it ([McAfee 2006](15031-0943-FullBook.docx" \l "Ref_1271_FILE150310943P3018" \o "(AutoLink):McAfee, A. 2006. \“Mastering the Three Worlds of Information Technology,\” Harvard Business Review), November, pp 141–148. UserName - DateTime: sii-4/4/2017 6:12:20 PM); [Sun 2012](15031-0943-FullBook.docx" \l "Ref_1291_FILE150310943P3018" \o "(AutoLink):Sun, H. 2012. \“Understanding User Revisions When Using Information System Features: Adaptive System Use and Triggers,\” MIS Quarterly (36:2), pp 453–478. UserName - DateTime: sii-4/4/2017 6:12:37 PM)) has been characterized using two life cycle phases. Transiting from the early phase of the ES life cycle to a phase of maturity, namely, from the shakedown to the onward and upward phase ([Markus and Tanis 2000](15031-0943-FullBook.docx" \l "Ref_1270_FILE150310943P3018" \o "(ManLink):Markus, L., and Tanis, C. 2000. \“The Enterprise Systems Experience – from Adoption to Success,\” in: Framing the Domains of IT Management: Projecting the Future through the Past, R.W. Zmud (ed.). Cincinnati, OH: Pinnaflex Educational Resources, Inc, pp. 173–207. UserName - DateTime: vge-4/5/2017 12:09:07 PM)), users seem to follow the general characteristics identified in learning theories ([Cotteleer and Bendoly 2006](15031-0943-FullBook.docx" \l "Ref_1236_FILE150310943P3018" \o "(AutoLink):Cotteleer, M.J., and Bendoly, E. 2006. \“Order Lead-Time Improvement Following Enterprise Information Technology Implementation: An Empirical Study,\” MIS Quarterly), pp 643–660. UserName - DateTime: sii-4/4/2017 6:11:55 PM); [Ranganathan and Brown 2006](15031-0943-FullBook.docx" \l "Ref_1279_FILE150310943P3018" \o "(AutoLink):Ranganathan, C., and Brown, C.V. 2006. \“ERP Investments and the Market Value of Firms: Toward an Understanding of Influential ERP Project Variables,\” Information Systems Research (17:2), pp 145–161. UserName - DateTime: sii-4/4/2017 6:12:25 PM)) by gaining competence over time ([Sedera and Dey 2013](15031-0943-FullBook.docx" \l "Ref_1285_FILE150310943P3018" \o "(AutoLink):Sedera, D., and Dey, S. 2013. \“User Expertise in Contemporary Information Systems: Conceptualization, Measurement and Application,\” Information & Management (50:8), pp 621–637. UserName - DateTime: sii-4/4/2017 6:12:31 PM)).

Many argue that the turbulence in the shakedown phase inhibits innovations and that the onward and upward phase is the best time for organizations to seek innovations. As such, the ‘mature’ organization seeks to ignite innovative actions through initiatives like ES business process improvements ([Davenport 2013](15031-0943-FullBook.docx" \l "Ref_1239_FILE150310943P3018" \o "(AutoLink):Davenport, T.H. 2013. Process Innovation: Reengineering Work through Information Technology. Harvard Business Press. UserName - DateTime: sii-4/4/2017 6:11:56 PM); [Srivardhana and Pawlowski 2007](15031-0943-FullBook.docx" \l "Ref_1290_FILE150310943P3018" \o "(AutoLink):Srivardhana, T., and Pawlowski, S.D. 2007. \“ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,\” The Journal of Strategic Information Systems (16:1), pp 51–69. UserName - DateTime: sii-4/4/2017 6:12:36 PM)) and ES upgrades ([Chua and Khoo 2011](15031-0943-FullBook.docx" \l "Ref_1235_FILE150310943P3018" \o "(AutoLink):Chua, C.E.H., and Khoo, H.M. 2011. \“How Organizations Motivate Users to Participate in Support Upgrades of Customized Packaged Software,\” Information & Management (48:8), pp 328–335. UserName - DateTime: sii-4/4/2017 6:11:55 PM)). Maturity is a relative term and should not be used as a yardstick to compare organizations. The interpretations of the maturity or the stability of the enterprise system can range from ‘a time for continuous improvements,’ ‘time waiting for the next upgrade’ and ‘leave it alone forever.’

While there is evidence that such activities like business process improvement initiatives and software upgrades would add value to an organization, many organizations seem to struggle to focus on innovation activities due to continuing disturbances of the software upgrades. For organizations to innovate using enterprise systems and digital technologies, it is best that a state where the inconsistencies are minimum is treated as the state of maturity. Then, instead of perfecting the enterprise system through upgrades and business process initiatives, the organization can start using the digital technologies to innovate. Such an approach will enable an organization to increases its emphasis on innovation through favorable characteristics of digital technologies, rather than perfecting the enterprise system.

Figure 18.2 is derived to create a better understanding of the relationship between the two ES life cycle phases and the levels of innovation. Organizations in the top left quadrant, which are attempting to innovate with enterprise systems at the shakedown phase, will have the highest risks. Researchers alluded to the ‘dip in performance’ as an ES shock ([Ross and Vitale 2000](15031-0943-FullBook.docx" \l "Ref_1280_FILE150310943P3018" \o "(AutoLink):Ross, J.W., and Vitale, M.R. 2000. \“The ERP Revolution: Surviving Vs. Thriving,\” Information Systems Frontiers (2:2), pp 233–241. UserName - DateTime: sii-4/4/2017 6:12:26 PM)), which indicates characteristics of radical innovations to the organization ([Kraemmerand et al. 2003](15031-0943-FullBook.docx" \l "Ref_1258_FILE150310943P3018" \o "(AutoLink):Kraemmerand, P., Møller, C., and Boer, H. 2003. \“ERP Implementation: An Integrated Process of Radical Change and Continuous Learning,\” Production Planning & Control (14:4), pp 338–348. UserName - DateTime: sii-4/4/2017 6:12:12 PM)). As such it denotes high risk to the organization. The lower left quadrant demonstrates the continuing innovation attempts at the shakedown phase. Such activities at the shakedown phase will be ambitious and are likely to provide less return on investment. The top right quadrant demonstrates the most favorable scenario, where the rate of innovation is high and the organization is at the onward and upward phase of the life cycle. It is again reminded that the ‘maturity’ is a relative notion, and once an organization reaches a balanced state, then one should refrain from meddling with the enterprise system. The likelihood that an organization uses digital technologies for innovation together with the mature enterprise system in this quadrant is high. The lower right quadrant highlights an organization with a stable enterprise system, but with low level of innovations. Such organizations miss out on the potential of their enterprise system’s stability. These organizations miss out on the potential opportunities to innovate. Perhaps, such organizations should restrict their continuing investments to enterprise systems and focus more on digital technologies.

<Insert [Figure 18.2](#_S22_FgC_figure___18__2) Here>

Figure 18.2 Maturity and innovation

Recognize ES as a platform

Enterprise systems provide a substantial amount of software features and functions to the organization. The historic discussion of enterprise systems are providing ‘best practice’ features and functions is a common factor that organizations considered when adopting enterprise systems. There is recent evidence of organizations treating the enterprise system as a platform emerging from the anecdotal commentary. Treating the enterprise system as a technology platform is another way that an organization can facilitate innovations. Such conceptualization will enable organizations to use its base for other applications, processes or technologies to be developed. The enterprise system as a platform has received traction due to its widespread adoption and the emergence of open technology architectures such as the NetWeaver platform interface by SAP ([Gawer and Cusumano 2012](15031-0943-FullBook.docx" \l "Ref_1246_FILE150310943P3018" \o "(AutoLink):Gawer, A., and Cusumano, M.A. 2012. \“How Companies Become Platform Leaders,\” MIT Sloan Management Review (49:2), pp 28–35. UserName - DateTime: sii-4/4/2017 6:12:01 PM)). An enterprise system is considered a technology platform that allows technologies to be integrated ([Tilson et al. 2010](15031-0943-FullBook.docx" \l "Ref_1296_FILE150310943P3018" \o "(AutoLink):Tilson, D., Lyytinen, K., and Sørensen, C. 2010. \“Research Commentary-Digital Infrastructures: The Missing IS Research Agenda,\” Information Systems Research (21:4), pp 748–759. UserName - DateTime: sii-4/4/2017 6:12:38 PM)). Considering the fundamentals of a platform, [Gawer (2009](15031-0943-FullBook.docx" \l "Ref_1245_FILE150310943P3018" \o "(AutoLink):Gawer, A. 2009. Platforms, Markets, and Innovation. Gloucestershire, UK: Edward Elgar Publishing. UserName - DateTime: sii-4/4/2017 6:12:00 PM)) recognizes the ability of the ES to acts as a building block, allowing other complementary technologies to be integrated ([Lokuge et al. 2016](15031-0943-FullBook.docx" \l "Ref_1268_FILE150310943P3018" \o "(AutoLink):Lokuge, S., Sedera, D., and Grover, V. 2016. \“Thinking inside the Box: Five Organizational Strategies Enabled through Information Systems,\” Pacific Asia Conference on Information Systems (PACIS 2016), Chiyai, Taiwan: AIS. UserName - DateTime: sii-4/4/2017 6:12:19 PM); [Sedera et al. 2016](15031-0943-FullBook.docx" \l "Ref_1287_FILE150310943P3018" \o "(AutoLink):Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. \“Innovating with Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,\” Information & Management (53:3), pp 366–379. UserName - DateTime: sii-4/4/2017 6:12:33 PM)).

Figure 18.3 provides four views of how organizations can position their innovations against the focus of the software: functional or platform. Commencing from the left panels, the traditional view of an enterprise system emphasizes innovation by adding new features and functionalities. Such an approach is limited, in that an organization attempting innovations by adding software features and functions will have a strong dependence on the enterprise system vendor. This would typically mean that a high rate of innovation would be a costly exercise for the organization. When considering the enterprise system as a platform, the opportunities presented to integrate digital technologies provide an opportunistic environment. However, anecdotal commentary suggests that, even though organizations have the ability to integrate their ES technology platform with digital technologies, they are reluctant to initiate due to risk aversion.

<Insert [Figure 18.3](#_S22_FgC_figure___18__3) Here>

Figure 18.3 Software focus and innovation

Reduce the vendor-led innovations

When ES were first implemented, there was much focus on maintaining ‘vanilla’ implementations. In a vanilla implementation, the organization adheres to the way espoused by the software vendor and made it easier for an organization to manage the enterprise system implementation and its subsequent upgrades. A vanilla implementation makes the organization forgo any software customizations to facilitate unique requirements of the organization. Following this approach led to high vendor dependence in traditional ES using organizations. As such, the traditional incumbents of enterprise systems developed a strong reliance on their software vendor and the implementation partner for innovations. However, over time, organizations have learnt much about the enterprise systems about its implementation and management. Moreover, the ES vendors also have improved the software architectures by making them more flexible and open.

These flexible and open architectures of enterprise systems now allow digital technologies to be connected with ES easily. Moreover, most of the digital technologies are innately vendor agnostic. The digital technologies use common software and data protocols. That means a service of a particular digital technology vendor can be obtained through most other service providers. Moreover, such characteristics like ease of use, ease of learning and the consumerization of IT have led to the creation of a growing network of contributors associated with digital technologies. As such, there are many third-party digital technology–based software applications that are developed to work with ES. The digital technology vendor agnosticism and dynamic contributor network make the scale and speed of innovation much faster compared to that of the ES.

Figure 18.4 provides a conceptual view of the rate of innovation against the continuum of vendor agnosticism. Historically, most organizations prefer the ‘vendor-led’ innovation approach for their ES initiatives. As such, the enterprise system becomes highly vendor specific. The rate of innovations coming from vendors through software upgrades and optional enhancements is restrained (top left corner). Digital technologies, on the other hand, will enable organizations to become vendor agnostic. This allows the organization to engage with a plethora of vendors beyond the enterprise system vendor for innovations. As such, this will provide opportunities for the organization to develop an aggressive innovation approach.

<Insert [Figure 18.4](#_S22_FgC_figure___18__4) Here>

Figure 18.4 Vendor agnosticism and innovation

Decentralized decision-making process

The traditional management structure of enterprise systems tends to be hierarchically top-down, managed by a central entity. Such a management structure was necessary for the organizations to maintain a ‘single instance’ enterprise system in the organization. However, the centralized decision making in enterprise systems management approach made it nearly impossible to accommodate any changes. Scholars argue that a centralized enterprise systems management approach enabled organizations to increase the emphasis of these mandated systems ([Sheu et al. 2004](15031-0943-FullBook.docx" \l "Ref_1289_FILE150310943P3018" \o "(AutoLink):Sheu, C., Chae, B., and Yang, C.-L. 2004. \“National Differences and ERP Implementation: Issues and Challenges,\” Omega (32:5), pp 361–371. UserName - DateTime: sii-4/4/2017 6:12:34 PM)). Moreover, the value-proposition with ES at the beginning of its adoption remained high with high risk of failure. As such, the centralized approach was suitable for organizations.

However, the centralized management approach introduces several substantial barriers to innovation. First, the tight control of the centralized approach introduces local inefficiencies. Centralization can lead to significant delays in decisions that impact executions through ES. For local managers with limited authority, the rapid response time to hyper-competitive market challenges can be a problem. Highly centralized ES initiatives may require local managers to contact remote centralized hosting services in certain situations. Second, poor creativity in relation to ES will emerge as a major issue associated with centralization. An overly top-down organizational approach naturally prohibits creative thinking and innovative ideas from line-of-business levels. On the other hand, a decentralized approach often promotes new product and service ideas conceived by regular employees and conveyed through their managers to the top. When there is a major distance in involvement between centralized leaders and line-of-business employees, there is little motivation for employees to ponder innovations, let alone communicate them internally.

Figure 18.5 demonstrates the scope of innovation for centralized and decentralized management structures. In the centralized management approach, which is typical in most organizations with ES, the organization requires a high level of coordination in order to attain a high rate of innovations. On the other hand, if the organization has a centralized management approach and the rate of innovation is low, then it would seem plausible that the organization is only concerned about the predetermined innovations. Such innovations may not withstand the sudden changes in the market, environment and circumstances. A decentralized management approach is best suitable for a portfolio of ES and digital technologies. A decentralized approach will enable the organization to include wider participation from a range of participants, from line-of-business to senior managers. Their participation will be informed by the accessibility of digital technologies, knowledge of digital technology gained through common channels and experience with the ES. If such attempts do not lead to a high rate of innovation, then the organization needs to re-think about its innovation and management approach.

<Insert [Figure 18.5](#_S22_FgC_figure___18__5) Here>

Figure 18.5 Software management approach and innovation

Final remarks

Enterprise systems are among the most prominent technologies in the 21st century. The advent and proliferation of ES since the late 1990s have changed the entire premise of the corporate IT landscape. Enterprise systems purport to have introduced best practices, integration and process standardization. Overall, there is ample evidence to suggest that the advent of ES provided organizations with new innovation possibilities. However, the role of ES is changing, especially in the past several years. The advent of digital technologies provides the organization with a two-speed IT portfolio to innovate. For organizations to continuously innovate using this two-speed IT portfolio, the changing role of the enterprise system must be well understood. This chapter attempts to contribute to the discussion of the changing role of the enterprise system. It provided four scenarios where ES can work effectively with digital technologies to increase the rate of innovation. For information systems research, the two-speed IT portfolio provides challenges and opportunities. It is the first time that corporate IT is presented with diversity of systems with a plethora of capabilities. The traditional organization will find it challenging to manage and excel with a two-speed IT portfolio by adhering to its traditional strategies. Empirical advice on the changes in the two-speed IT portfolio is scant. Scholars may employ theories like resource-based views ([Barney 2001](15031-0943-FullBook.docx" \l "Ref_1225_FILE150310943P3018" \o "(AutoLink):Barney, J.B. 2001. \“Is the Resource-Based \“View\” a Useful Perspective for Strategic Management Research? Yes,\” Academy of Management Review (26:1), pp 41–56. UserName - DateTime: sii-4/4/2017 6:11:46 PM)), ambidexterity ([Gibson and Birkinshaw 2004](15031-0943-FullBook.docx" \l "Ref_1247_FILE150310943P3018" \o "(AutoLink):Gibson, C.B., and Birkinshaw, J. 2004. \“The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity,\” Academy of Management Journal (47:2), pp 209–226. UserName - DateTime: sii-4/4/2017 6:12:02 PM)) or the theory for organizational readiness for change ([Weiner 2009](15031-0943-FullBook.docx" \l "Ref_1300_FILE150310943P3018" \o "(AutoLink):Weiner, B.J. 2009. \“A Theory of Organizational Readiness for Change,\” Implementation Science (4:1), pp 67–76. UserName - DateTime: sii-4/4/2017 6:12:42 PM)) to explore evidence-based theoretical sound ways to understand how to best employ the two-speed IT portfolio for innovations.

Note

References

Abrell, T., Pihlajamaa, M., Kanto, L., vom Brocke, J., and Uebernickel, F. 2016. “The Role of Users and Customers in Digital Innovation: Insights From B2B Manufacturing Firms,” *Information & Management* (53:3), pp. 324–335.

Avedillo, J. G., Begonha, D., and Peyracchia, A. 2015. *Two Ways to Modernize IT Systems for the Digital Era*. Insights & Publications. www.mckinsey.com: McKinsey.

Barney, J. B. 2001. “Is the Resource-Based ‘View’ a Useful Perspective for Strategic Management Research? Yes,” *Academy of Management Review* (26:1), pp. 41–56.

Benner, M. J., and Tushman, M. L. 2003. “Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited,” *Academy of Management Review* (28:2), pp. 238–256.

Bingi, P., Sharma, M. K., and Godla, J. K. 1999. “Critical Issues Affecting an ERP Implementation,” *Information Systems Management* (16:3), pp. 7–14.

Botta-Genoulaz, V., and Millet, P.-A. 2005. “A Classification for Better Use of ERP Systems,” *Computers in Industry* (56:6), pp. 573–587.

Burton-Jones, A., and Grange, C. 2012. “From Use to Effective Use: A Representation Theory Perspective,” *Information Systems Research* (24:3), pp. 632–658.

Carlo, J. L., Gaskin, J., Lyytinen, K., and Rose, G. M. 2014. “Early vs. Late Adoption of Radical Information Technology Innovations Across Software Development Organizations: An Extension of the Disruptive Information Technology Innovation Model,” *Information Systems Journal* (24:3).

Carr, N. G. 2003. “IT Doesn’t Matter,” *Harvard Business Review* (81:5), pp. 41–49.

Ceccagnoli, M., Forman, C., Huang, P., and Wu, D. 2012. “Co-creation of Value in a Platform Ecosystem: The Case of Enterprise Software,” *MIS Quarterly* (36:1), pp. 263–290.

Chakravarty, A., Grewal, R., and Sambamurthy, V. 2013. “Information Technology Competencies, Organizational Agility, and Firm Performance: Enabling and Facilitating Roles,” *Information Systems Research* (24:4), pp. 976–997.

Chang, W., Franke, G. R., Butler, T. D., Musgrove, C. F., and Ellinger, A. E. 2014. “Differential Mediating Effects of Radical and Incremental Innovation on Market Orientation-Performance Relationship: A Meta-Analysis,” *Journal of Marketing Theory and Practice* (22:3), pp. 235–250.

Chua, C.E.H., and Khoo, H. M. 2011. “How Organizations Motivate Users to Participate in Support Upgrades of Customized Packaged Software,” *Information & Management* (48:8), pp. 328–335.

Cotteleer, M. J., and Bendoly, E. 2006. “Order Lead-Time Improvement Following Enterprise Information Technology Implementation: An Empirical Study,” *MIS Quarterly*, pp. 643–660.

Davenport, T. H. 2000a. “The Future of Enterprise System-Enabled Organizations,” *Information Systems Frontiers* (2:2), pp. 163–180.

Davenport, T. H. 2000b. *Mission Critical: Realizing the Promise of Enterprise Systems*. Cambridge, MA: Harvard Business Press.

Davenport, T. H. 2013. *Process Innovation: Reengineering Work Through Information Technology*. Cambridge, MA: Harvard Business Press.

Davenport, T. H., Harris, J. G., and Cantrell, S. 2004. “Enterprise Systems and Ongoing Process Change,” *Business Process Management Journal* (10:1), pp. 16–26.

Dutta, A., Lee, H., and Yasai-Ardekani, M. 2014. “Digital Systems and Competitive Responsiveness: The Dynamics of IT Business Value,” *Information & Management* (51:6), pp. 762–773.

*Economist*. 2007. “Liquid Concrete: As Software Shifts to an “On Demand” Model, Can SAP Move With the Times?” *Economist*. www.economist.com.

Eden, R., Sedera, D., and Tan, F. 2014. “Sustaining the Momentum: Archival Analysis of Enterprise Resource Planning Systems (2006–2012),” *Communications of the Association for Information Systems* (35:3), pp. 39–82.

Esteves, J. 2009. “A Benefits Realisation Road-Map Framework for ERP Usage in Small and Medium-Sized Enterprises,” *Journal of Enterprise Information Management* (22:1/2), pp. 25–35.

Gable, G. G., Sedera, D., and Chan, T. 2008. “Re-Conceptualizing Information System Success: The IS-Impact Measurement Model,” *Journal of the Association for Information Systems* (9:7), pp. 377–408.

Gawer, A. 2009. *Platforms, Markets, and Innovation*. Gloucestershire, UK: Edward Elgar.

Gawer, A., and Cusumano, M. A. 2012. “How Companies Become Platform Leaders,” *MIT Sloan Management Review* (49:2), pp. 28–35.

Gibson, C. B., and Birkinshaw, J. 2004. “The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity,” *Academy of Management Journal* (47:2), pp. 209–226.

Gorla, N., Somers, T. M., and Wong, B. 2010. “Organizational Impact of System Quality, Information Quality, and Service Quality,” *Journal of Strategic Information Systems* (19:3), pp. 207–228.

Grover, V., and Segars, A. H. 2005. “An Empirical Evaluation of Stages of Strategic Information Systems Planning: Patterns of Process Design and Effectiveness,” *Information & Management* (42:5), pp. 761–779.

Ives, B., Valacich, J. S., Watson, R. T., Zmud, R. W., Alavi, M., Baskerville, R., Baroudi, J. J., Beath, C., Clark, T., and Clemons, E. K. 2002. “What Every Business Student Needs to Know About Information Systems,” *Communications of the Association for Information Systems* (9:1), p. 30.

Jansen, J.J.P., Van Den Bosch, F.A.J., and Volberda, H. W. 2006. “Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators,” *Management Science* (52:11), pp. 1661–1674.

Kamhawi, E. M., and Gunasekaran, A. 2009. “ERP Systems Implementation Success Factors: IS and Non-IS Managers’ Perceptions,” *International Journal of Business Information Systems* (4:6), pp. 688–704.

Karimi, J., Somers, T. M., and Bhattacherjee, A. 2007. “The Impact of ERP Implementation on Business Process Outcomes: A Factor-Based Study,” *Journal of Management Information Systems* (24:1), pp. 101–134.

Kemp, M., and Low, G. 2008. “ERP Innovation Implementation Model Incorporating Change Management,” *Business Process Management Journal* (14:2), pp. 228–242.Kharabe, A., and Lyytinen, K. J. 2012. “Is Implementing ERP Like Pouring Concrete Into a Company? Impact of Enterprise Systems on Organizational Agility,” in: *Thirty-Third International Conference on Information Systems* (ICIS 2012). Orlando.

Kharabe, A., Lyytinen, K., and Grover, V. 2013. “Do Organizational Competencies Influence How Enterprise Systems Foster Organizational Agility?,” in: *International Conference On Information Systems* (ICIS 2013). Milan, Italy.

Klaus, H., Rosemann, M., and Gable, G. 2000. “What Is ERP?” *Information Systems Frontiers* (2:2), pp. 141–162.

Kraemmerand, P., Møller, C., and Boer, H. 2003. “ERP Implementation: An Integrated Process of Radical Change and Continuous Learning,” *Production Planning & Control* (14:4), pp. 338–348.

Kumar, V., Maheshwari, B., and Kumar, U. 2003. “An Investigation of Critical Management Issues in ERP Implementation: Empirical Evidence From Canadian Organizations,” *Technovation* (23:10), pp. 793–807.

Kumar, K., and van Hillegersberg, J. 2000. “ERP Experiences and Evolution,” *Communications of the ACM* (43:4), April 2000, pp. 22–26.

Leifer, R., McDermott, C. M., O’Connor, G. C., Peters, L. S., Rice, M. P., and Veryzer, R. W. 2000. *Radical Innovation: How Mature Companies Can Outsmart Upstairs*. Boston, MA: Harvard Business School Press.

Lewis, M. W., Welsh, M. A., Dehler, G. E., and Green, S. G. 2002. “Product Development Tensions: Exploring Contrasting Styles of Project Management,” *Academy of Management Journal* (45:3), pp. 546–564.

Lokuge, K.S.P. 2015. *Agile Innovation: Innovating With Enterprise Systems*. Queensland University of Technology.

Lokuge, S., and Sedera, D. 2014a. “Deriving Information Systems Innovation Execution Mechanisms,” *Australasian Conference on Information Systems* (ACIS 2014), Auckland, New Zealand: AIS Library.

Lokuge, S., and Sedera, D. 2014b. “Enterprise Systems Lifecycle-Wide Innovation,” *Americas Conference on Information Systems* (AMCIS 2014), Savannah, Georgia: AIS Library.

Lokuge, S., and Sedera, D. 2014c. “Enterprise Systems Lifecycle-Wide Innovation Readiness,” *Pacific Asia Conference on Information Systems* (PACIS 2014), Chengdu, China: AIS Library.

Lokuge, S., and Sedera, D. 2016. “Is Your IT Eco-System Ready to Facilitate Organizational Innovation? Deriving an IT Eco-System Readiness Measurement Model,” *International Conference on Information Systems* (ICIS 2016), Dublin, Ireland: AIS.

Lokuge, S., Sedera, D., and Grover, V. 2016. “Thinking Inside the Box: Five Organizational Strategies Enabled Through Information Systems,” *Pacific Asia Conference on Information Systems* (PACIS 2016), Chiyai, Taiwan: AIS.

Mandal, P., and Gunasekaran, A. 2003. “Issues in Implementing ERP: A Case Study,” *European Journal of Operational Research* (146:2), pp. 274–283.

Markus, L., and Tanis, C. 2000. “The Enterprise Systems Experience – From Adoption to Success,” in: *Framing the Domains of IT Management: Projecting the Future Through the Past*, R. W. Zmud (ed.). Cincinnati, OH: Pinnaflex Educational Resources, pp. 173–207.

McAfee, A. 2006. “Mastering the Three Worlds of Information Technology,” *Harvard Business Review*, November, pp. 141–148.

McAfee, A., and Brynjolfsson, E. 2008. “Investing in the IT That Makes a Competitive Difference,” *Harvard Business Review* (86:7/8), pp. 98–107.

McLean, E., and Sedera, D. 2010. “The Measurement of Information System Use: Preliminary Considerations,” *Americas Conference on Information Systems* (AMCIS), Lima, Peru: AIS.

Murphy, K. E., and Simon, S. J. 2002. “Intangible Benefits Valuation in ERP Projects,” *Information Systems Journal* (12:4), October 1, 2002, pp. 301–320.

Nambisan, S. 2013. “Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research,” *Journal of the Association for Information Systems* (14:4), pp. 215–226.

Nylén, D., and Holmström, J. 2015. “Digital Innovation Strategy: A Framework for Diagnosing and Improving Digital Product and Service Innovation,” *Business Horizons* (58:1), pp. 57–67.

PwC. 2012. “How to Drive Innovation and Business Growth: Leveraging Emerging Technology for Sustainable Growth,” www.pwc.com/en\_US/us/supply-chain-management/assets/pwc-oracle-innovation-white-paper.pdf.

Rai, A., and Tang, X. 2010. “Leveraging IT Capabilities and Competitive Process Capabilities for the Management of Interorganizational Relationship Portfolios,” *Information Systems Research* (21:3), pp. 516–570.

Ranganathan, C., and Brown, C. V. 2006. “ERP Investments and the Market Value of Firms: Toward an Understanding of Influential ERP Project Variables,” *Information Systems Research* (17:2), pp. 145–161.

Ross, J. W., and Vitale, M. R. 2000. “The ERP Revolution: Surviving vs. Thriving,” *Information Systems Frontiers* (2:2), pp. 233–241.

Saraf, N., Liang, H., Xue, Y., and Hu, Q. 2013. “How Does Organisational Absorptive Capacity Matter in the Assimilation of Enterprise Information Systems?” *Information Systems Journal* (23:3), pp. 245–267.

Sasidharan, S., Santhanam, R., Brass, D. J., and Sambamurthy, V. 2012. “The Effects of Social Network Structure on Enterprise Systems Success: A Longitudinal Multilevel Analysis,” *Information Systems Research* (23:3/1/2), pp. 658–678.

Schenk, B. 2015. “The Role of Enterprise Systems in Process Innovation,” in: *BPM-Driving Innovation in a Digital World*, J.V. Brocke and T. Schmiedel (eds.). Switzerland: Springer, pp. 75–84.

Seddon, P. B., Calvert, C., and Yang, S. 2010. “A Multi-Project Model of Key Factors Affecting Organizational Benefits From Enterprise Systems,” *MIS Quarterly* (34:2), pp. 305–328.

Sedera, D., and Dey, S. 2013. “User Expertise in Contemporary Information Systems: Conceptualization, Measurement and Application,” *Information & Management* (50:8), pp. 621–637.

Sedera, D., and Gable, G. G. 2010. “Knowledge Management Competence for Enterprise System Success,” *Journal of Strategic Information Systems* (19:4), pp. 296–306.

Sedera, D., Lokuge, S., Grover, V., Sarker, S., and Sarker, S. 2016. “Innovating With Enterprise Systems and Digital Platforms: A Contingent Resource-Based Theory View,” *Information & Management* (53:3), pp. 366–379.

Shang, S., and Seddon, P. B. 2007. “Managing Process Deficiencies With Enterprise Systems,” *Business Process Management Journal* (13:3), pp. 405–416.

Sheu, C., Chae, B., and Yang, C.-L. 2004. “National Differences and ERP Implementation: Issues and Challenges,” *Omega* (32:5), pp. 361–371.

Srivardhana, T., and Pawlowski, S. D. 2007. “ERP Systems as an Enabler of Sustained Business Process Innovation: A Knowledge-Based View,” *Journal of Strategic Information Systems* (16:1), pp. 51–69.

Sun, H. 2012. “Understanding User Revisions When Using Information System Features: Adaptive System Use and Triggers,” *MIS Quarterly* (36:2), pp. 453–478.

Swanson, E. B. 1994. “Information Systems Innovation Among Organizations,” *Management Science* (40:9), pp. 1069–1092.

Swanson, E. B., and Dans, E. 2000. “System Life Expectancy and the Maintenance Effort: Exploring Their Equilibration,” *MIS Quarterly* (24:2), pp. 277–297.

Swanson, E. B., and Ramiller, N. C. 2004. “Innovating Mindfully With Information Technology,” *MIS Quarterly* (28:4), pp. 553–583.

Tilson, D., Lyytinen, K., and Sørensen, C. 2010. “Research Commentary-Digital Infrastructures: The Missing IS Research Agenda,” *Information Systems Research* (21:4), pp. 748–759.

Tushman, M. L., and Anderson, P. 1986. “Technological Discontinuities and Organizational Environments,” *Administrative Science Quarterly* (31:3), pp. 439–465.

Utterback, J. M. 1994. *Mastering the Dynamics of Innovation*. Boston, MA: Harvard Business School Press.

Van den Bergh, J., and Viaene, S. 2013. “Process Innovation: Redesigning an Enterprise Backbone System,” in: *Enterprise Information Systems of the Future*. Springer, pp. 1–17.

Weiner, B. J. 2009. “A Theory of Organizational Readiness for Change,” *Implementation Science* (4:1), pp. 67–76.

Wolfe, R. A. 1994. “Organizational Innovation: Review, Critique and Suggested Research Directions,” *Journal of Management Studies* (31:3), pp. 405–431.

Yoo, Y., Boland Jr, R. J., Lyytinen, K., and Majchrzak, A. 2012. “Organizing for Innovation in the Digitized World,” *Organization Science* (23:5), pp. 1398–1408.

Yoo, Y., Henfridsson, O., and Lyytinen, K. 2010. “The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research,” *Information Systems Research* (21:4), pp. 724–735.

Zaltman, G., Duncan, R., and Holbek, J. 1977. *Innovations and Organizations*. New York: John Wiley & Sons.

Zittrain, J. L. 2006. “The Generative Internet,” *Harvard Law Review* (119:7), pp. 1974–2040.

1. For further details on two-speed IT, refer to Avedillo, J. G., Begonha, D., & Peyracchia, A. (2015). *Two Ways to Modernize IT Systems for the Digital Era*. Insights & Publications. Retrieved from www.mckinsey.com/insights/business\_technology/two\_ways\_to\_modernize\_it\_systems\_for\_the\_digital\_era. [↑](#endnote-ref-1)
2. [↑](#endnote-ref-2)