

## Challenges for digital transformation – towards a conceptual decision support guide for managers

Ciara Heavin & Daniel J. Power

**To cite this article:** Ciara Heavin & Daniel J. Power (2018) Challenges for digital transformation – towards a conceptual decision support guide for managers, Journal of Decision Systems, 27:sup1, 38-45, DOI: [10.1080/12460125.2018.1468697](https://doi.org/10.1080/12460125.2018.1468697)

**To link to this article:** <https://doi.org/10.1080/12460125.2018.1468697>



Published online: 08 May 2018.



Submit your article to this journal [↗](#)



Article views: 21172



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 129 View citing articles [↗](#)



DSS IN ORGANISATIONS



## Challenges for digital transformation – towards a conceptual decision support guide for managers

Ciara Heavin<sup>a</sup>  and Daniel J. Power<sup>b</sup>

<sup>a</sup>Business Information Systems, University College Cork, Cork, Ireland; <sup>b</sup>College of Business and Administration, University of Northern Iowa, Cedar Falls, IA, USA

### ABSTRACT

Digital technologies are transforming operations, products and services in organisations large and small. The digital transformation of organisations is extolled as a solution to organisational challenges related to both efficiency and effectiveness. To date, there has been limited consideration of the challenges of successfully operationalising a transformative digital transformation approach. This article examines some of the common dilemmas facing managers that may be relevant across a range of organisational scenarios. Seven factors are analysed to provide a starting point for creating successful digital transformations in business. To begin to tackle these challenges, this research-in-progress paper proposes a digital transformation decision support guide for managers. This tool may be utilised by managers, supporting them to move from an ad hoc technology-driven approach to a more systematic integrated approach to digital transformation.

### ARTICLE HISTORY

Received 15 March 2018  
Accepted 29 March 2018

### KEYWORDS

Word; digital transformation; challenges; dilemmas; decision support guide; managers

## 1. Introduction

Meeting the needs of 7.4 billion people on Planet Earth is challenging and our population is growing at the rate of 1 more person every 14 s. Imagine a Customer Relationship Management (CRM) system with 7.4 billion or even 74 million customers. Imagine how much food McDonald's serves every day. In a 2010 estimate, McDonald's served 1% of the world's population every day or approximately 74 million people. The digital transformation of organisations is required given the expanding global population, but changing processes and activities to use more digital technologies and implement predictive analytics and artificial intelligence has costs and consequences. Managers face some difficult choices among potentially disruptive technologies and digital transformation initiatives. This research-in-progress article considers the key dilemmas facing managers undertaking digital transformation initiatives. Further, a conceptual decision support tool is presented as a guide for managers who are tasked with operationalising digital transformation in their organisations. The final section considers digital transformation broadly, conclusions and opportunities for further research.

## 2. Digital transformation in organisations

Digitisation and digital transformation has been occurring in organisations since the 1950s. The vacuum tube computers of 1943–1958 led to transformations in accounting, decision support and transaction processing. The gains were modest because of technology limits and constraints. The 1960s saw more transformations including introduction of some manufacturing robots, online transaction processing and time sharing. By the mid-1970s, the personal computer revolution was beginning. Throughout the 1980s adoption of computing technology accelerated. Visicalc and Lotus 1 2 3 were ‘killer’ applications that changed management and management decision-making. The 1990s brought data warehouses, local area networks, the global Internet, digital data storage and digital phones to the expanding technology possibilities available to managers. The 2000s saw the realisation of affordable cellular phones, faster parallel processors, distributed computing and storage and digital cellular networks. Digital data storage and computing capabilities increased exponentially in the early 2010s. Enterprise applications, the Internet of Things (IoT), Machine Learning, Artificial Intelligence (AI) applications, speech recognition and modelling and analytics technologies provide real-time monitoring, digital assistants, personalisation, distributed decision support and predictive analytics. The next section identifies digital transformation challenges in general.

### 2.1. Digital transformation challenges

To compete and survive, most organisations must include appropriate digital transformation as a core strategy. Digital transformation is defined as ‘the use of technology to radically improve performance or reach of enterprises’ (Westerman, Bonnet, & McAfee, 2014). Westerman et al. (2014) note that ‘executives are digitally transforming three key areas of their enterprises: customer experience, operational processes and business models’. Digital transformation is also defined as ‘the application of digital technologies to fundamentally impact all aspects of business and society’ (Gruman, 2016). Both views of digital transformation are ambitious, the latter is all encompassing. The following are major challenges/dilemmas facing managers:

(1) *Priorities* (Tiersky, 2017)

The first dilemma is whether increasing the efficiency of current operations is the priority or should the focus be on the customer and meeting needs (Tiersky, 2017). The two tasks may be incompatible and focusing on efficiency may reduce customer satisfaction, customer loyalty and purchases.

(2) *Aggregate data or personalise*

Emphasising predicting customer behaviour may lead to seeking patterns and ignoring serving individual customers (Tiersky, 2017). Meeting needs often requires personalisation, while too much emphasis on patterns and customer categories and stereotypes leads to depersonalisation. Ideally, managers will pay attention to trends and profiles of customers and employees and understand, and serve the individual.

(3) *Providing more resources to IT staff vs. more self-service analytics*

Both IT staff and non-IT employees want more resources (Panetta, 2016). The return from more data scientists and IT staff compared to more training and resources for managers and staff in functional areas is difficult to assess.

(4) *Storing all data vs. selecting data to store that serves a specific purpose* (Tiersky, 2017)

All data can be stored at a cost. Understanding what data is captured and available for analysis is considerably more difficult. Indexing data resources and assessing data quality while finding opportunities to combine data resources creates even more challenges. Data are both an opportunity and a problem. Data that are not or cannot be used is worthless.

(5) *Work performed by people vs. computing machines* (Newman, 2016)

Computing machines and robots have and will continue to displace unskilled and semi-skilled workers (Davenport & Kirby, 2016). The ongoing transformation involving Question/Answer bots, personal assistants and decision automation suggest that skilled employees may also be replaced.

(6) *Security vs. accessibility*

Data can be easy to access and use or difficult. Managers must balance data importance and sensitivity with accessibility concerns. This is a real dilemma in the healthcare domain (Filkins et al., 2016).

(7) *Privacy of individuals vs. understanding of an individual*

While digital transformation has its challenges, existing research indicates that the digital phenomenon is an opportunity to innovate and redefine how organisations do business (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013).

### 3. Confronting digital transformation dilemmas

The two main aspects of digital transformation are defined in terms of (1) technology and (2) customer or user (cf. Henriette, Feki, & Boughzala, 2016). From a technological perspective, according to Bharadwaj et al. (2013) businesses are taking advantage of new hardware, software and advances in the availability of the Internet to create new digital products and services. The role of the Chief Digital Officer (CDO) emphasises the organisational shift towards digital technical transformation (cf., CIO, 2013). In a recent McKinsey report, Rickards, Smaje, and Sohoni (2015) outline the broad role of the new CDO highlighting the need to hire someone who is focused on transformative organisational change, someone who is 'obsessed with the customer'.

Digital technologies and serving customers are not mutually exclusive, indeed digital technologies are a means for organisations to transform their 'customer-side' operations embedding technology into services with the aim of building a customer-centric organisation (cf. Setia, Venkatesh, & Joglekar, 2013). Since at least 2013, management consulting companies have promoted 'digital-first customer relationships' (Cartina, 2014; McQuivey, 2014). This digital customer experience goes well beyond the promise of CRM providing customers with a choice of channels that are time and location independent supporting a holistic customer experience beyond the purchase of a product or service – prompting important questions around managerial decisions to adopt new technologies as part of a formal strategy for digital transformation.

However, while technology is a key aspect of any digital transformation programme, it is only one component of any digital transformation strategy. This is supported by the findings from the IT Sloan Management Review and Deloitte studies on digitalisation. Kane, Palmer, Phillips, Kiron, and Buckley, (2015) continue to place the role of humans, organisational culture and the need for formal strategic planning at the heart of successful digital transformation initiatives. Further, McKendrick (2017) contends that digitally transforming organisations need to consider technology and culture in tandem. Operationally, this means closely aligning ‘fundamental changes in corporate culture’ with the adoption of a ‘constellation of technologies’ (McKendrick, 2017). According to Westerman, Bonnet and McAfee (2012) companies take different approaches to digital transformation and organisations react to digital transformation in different ways. For those managers trying to make sense of digital transformation as a strategy for their organisation or business function, the next section presents a decision support guide that may be useful in helping them achieve this ambition.

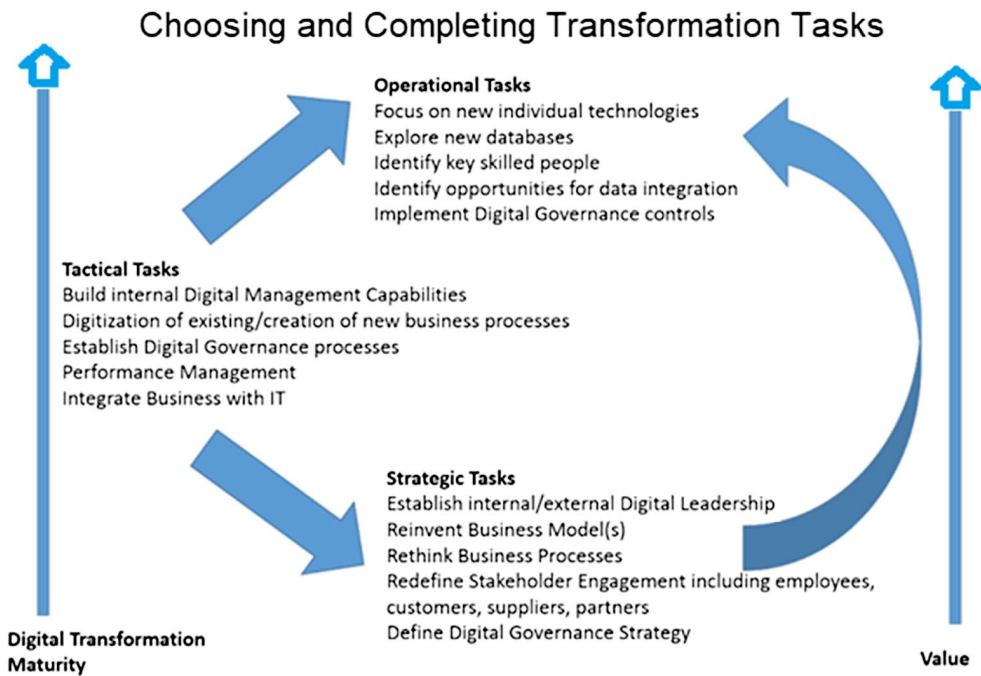
### **3.1. A conceptual decision support guide for digital transformation**

In a recent Forbes article, Kerschberg (2017) suggests that technology is central to organisational digital transformation, in particular adopting analytics, big data, mobile, cloud, IoT and application development. While technology may be at the core of digital transformation, successful digital transformation requires excellent leadership, a supportive culture and new business processes. Leadership should promote and cultivate a data-based culture. Digital transformation remains a complex task that begins with strategic leadership and a digital organisation strategy.

In a related discussion on digital transformation, cf., Power (2017) states that a strategic vision for digital transformation is useful, however, vision must be grounded in customer needs and technology possibilities. Indeed, business transformation cannot happen without people making decisions about technology. With this view in mind, Figure 1 presents a conceptual decision support guide for managers interested in digital transformation.

The conceptual model highlights three levels of organisational tasks for digital transformation including: (1) strategic tasks, (2) tactical tasks and (3) operational tasks. The levels are characterised by a set of tasks that should be completed as part of an organisation’s approach to digital transformation. Through the selection of some or all of these tasks, organisations can move from an ad hoc approach to a more systematic approach to digital transformation. Achieving digital transformation that is stable and ‘mature’ comes from successfully completing transformation tasks.

According to Westerman et al. (2012), digital transformation maturity may be characterised by (1) the level of investment in technology and (2) the level of investment in leadership to enable transformation. In their article, Westerman et al. (2012) indicate that increased digital transformation maturity results in increased value. Value is typically measured in terms of improved financial performance of the organisation. The transformation tasks may be broadly considered in terms of people, processes and technology. For any business strategy to be successful, activities across these levels need to be aligned. In their Harvard Business Review article, Trevor and Varcoe (2017) promote the notion of strategies, capabilities and resources to achieve digital transformation including systems that ‘should be arranged to support the enterprise’s purpose’.



**Figure 1.** Conceptual transformation decision support guide.

*Strategic tasks* represent a high level collection of activities that implement a digital transformation strategy. This list of task includes developing digital leadership capability (Westerman et al., 2012), reinventing business models, rethinking business processes, redefining stakeholder engagement (Kerschberg, 2017) and developing a digital governance strategy (Ernst & Young, 2017). While this list is not exhaustive, it is moving towards a more balanced and holistic approach for managers to tackle digital transformation in their organisations.

*Tactical tasks* are integral to the success of a transformation strategy, as illustrated by the ‘middle out’ notation used in Figure 1. Trevor and Varcoe (2017) refer to this mediating managerial level in terms of building organisational capabilities. At this level, it is important for managers to consider and select tasks that provide them with the means (capability) to deliver on a transformation strategy. These tactical tasks will drive the transformation agenda in an organisation with managers asking questions around how transformation can be achieved based on the capabilities available. Tactical tasks are concerned with designing new business processes, building disruptive new business models and defining data governance processes. It is also useful to consider new mechanisms for evaluating performance in terms of achieving digital transformation. This may be an opportunity for managers to define new measures of organisational success including understanding customer engagement and customer experience.

*Operational tasks* are focused around the questions managers will need to answer for (1) selecting and developing technologies, (2) establishing viable data integration platforms, (3) choosing necessary security controls that will balance data access with data protection and (4) identifying and developing the right people capabilities to achieve the digital vision

for the organisation. Managers need to select and complete tasks that allow them to develop 'assets that will be useful in a digitally transformed world' (cf., Capgemini Consulting, 2011).

#### 4. Discussion and conclusion

This research-in-progress paper considers seven challenges for managers pursuing digital transformation. Existing literature highlights an overemphasis on technology as part of a digital transformation strategy (Kane et al., 2015; McKendrick, 2017). While the use of new and innovative technologies is integral to transformation strategies focused on innovation, the reinvention of organisational business models, improved decision-making and improved customer engagement, broader organisational considerations such as strategy formulation, cultural change and new agile methodologies are necessary for organisations aspiring to digital transformation maturity (Kane et al., 2015; McKendrick, 2017; Panetta, 2016; Tiersky, 2017). To achieve this, a conceptual decision support guide for digital transformation is presented. This tool is targeted at managers facing the digital transformation dilemmas outlined above. This model codifies a formal integrated approach for managers tackling digital transformation, including people, technology, business operations, IT operations, compliance and regulation.

A strategic vision for digital transformation is useful, but vision must be grounded in a deep understanding of customer needs and technology possibilities. Many organisations have undergone significant digital transformation with varying degrees of success. Identifying processes that are ripe for digitisation, building/buying technologies to better serve the customer and establishing new disruptive business models embody the digital reinvention of many organisations (Rickards et al., 2015). However, organisational digitalisation is complex and challenges exist. As an organisational strategy, digital transformation requires top management support to leverage new technologies to do key organisational activities differently at an operational and strategic level (Henriette et al., 2016). Notwithstanding the dilemmas incurred in the pursuit of digital strategies in business, there have been many documented successes. The well-known digital winners include Uber and Netflix.

Organisational digital technologies are characterised by their ability to serve the personalised needs of the customer and 'to go beyond their borders, by impacting products, business processes, sales channels, and supply chains' (Matt, Hess, & Benlian, 2015, p. 339). Matt et al. (2015) argue that 'digital transformation strategies seek to coordinate and prioritise the many independent threads of digital transformation' (p. 339). Completing the appropriate mix of tasks should increase digital maturity and create a stable digital transformation. Technological maturity is at the heart of achieving real digital transformation maturity. Future studies should involve managers testing the decision support guide as part of their digital transformation strategy. To begin a transformation journey, managers need to move beyond focusing on new individual technologies to develop a comprehensive digital technology capability that is closely aligned to a well-defined transformation strategy. Digital transformation can both solve problems and create new problems. Successful digitalisation creates a positive, long-term, net benefit for an organisation. Applying digital technologies can create a data-based virtuous feedback cycle that leads to adopting more innovative and transformative digital solutions.



## Disclosure statement

No potential conflict of interest was reported by the authors.

## ORCID

Ciara Heavin  <http://orcid.org/0000-0001-8237-3350>

## References

- Bharadwaj, A., El Sawy, O., Pavlou, P., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37(2), 471–482.
- Capgemini Consulting (2011). *Digital transformation: A roadmap for billion-dollar organizations*. Retrieved August 21, 2017, from [https://www.capgemini.com/resource-file-access/resource/Pdf/Digital\\_Transformation\\_\\_A\\_Road-Map\\_For\\_Billion-Dollar\\_Organizations.Pdf](https://www.capgemini.com/resource-file-access/resource/Pdf/Digital_Transformation__A_Road-Map_For_Billion-Dollar_Organizations.Pdf)
- Cartina. (2014). *Digital and customer loyalty: Mutually exclusive or perfect partners?* Retrieved November 12, 2017, from <http://cartina.se/insights/digital-and-customer-loyalty-mutually-exclusive-or-perfect-partners/>
- CIO. (2013). *Why the chief digital officer role is on the rise*. Retrieved June 11, 2017, from <http://www.cio.com/article/2380788/careers-staffing/why-the-chief-digital-officer-role-is-on-the-rise.html>
- Davenport, T., & Kirby, J. (2016). *Only humans need apply: Winners and losers in the age of smart machines*. Harper Business.
- Ernst and Young. (2017). *Why Digital Governance Matter*. Retrieved August 21, 2017, from <http://www.ey.com/gl/en/services/advisory/ey-why-digital-governance-matters>
- Filkins, B. L., Kim, J. Y., Roberts, B., Armstrong, W., Miller, M. A., Hultner, M. L., ... Steinhubl, S. R. (2016). Privacy and security in the era of digital health: What should translational researchers know and do about it? *American Journal of Translational Research*, 8(3), 1560–1580.
- Gruman, G. (2016). What digital transformation really means. *InfoWorld*. Retrieved November 20, 2017, from <http://www.infoworld.com/article/3080644/it-management/what-digital-transformation-really-means.html>
- Henriette, E., Feki, M., & Boughzala, I. (2016). Digital transformation challenges. 10th Mediterranean Conference on Information Systems, University of Nicosia.
- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Technology, drives digital transformation - becoming a digitally mature enterprise. *MIT Sloan Management Review*. Retrieved January 24, 2018, from <https://sloanreview.mit.edu/projects/strategy-drives-digital-transformation/>
- Kerschberg, B. (2017). *How digital disrupts operations, business processes and customer experience*. Retrieved August 21, 2017, from <https://www.forbes.com/sites/benkerschberg/2017/03/01/how-digital-disrupts-operations-and-business-processes-as-well-as-customer-experience/#40ba59e25466>
- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, 57(5), 339–343.
- McKendrick, J. (2017). *The 5 traits of digitally advanced companies*. Retrieved January 24, 2018, from <https://www.forbes.com/sites/joemckendrick/2017/07/14/the-5-traits-of-digitally-advanced-companies/#1e88910c25ee>
- McQuivey, J. (2014). *Digital disruption replaces brand relationship with digital customer relationship*. Retrieved November 28, 2017, from <http://www.1to1media.com/digital-engagement>
- Newman, D. (2016). *Top 10 Trends For Digital Transformation In 2017*. Retrieved January 26, 2017, from <https://www.forbes.com/sites/danielnewman/2016/08/30/top-10-trends-for-digital-transformation-in-2017/#5ce914d947a5>
- Panetta, K. (2016). *Analyst answers: The CIO's biggest digital transformation challenges*. Retrieved January 24, 2018, from <https://www.gartner.com/smarterwithgartner/cios-biggest-digital-transformation-challenges/>
- Power, D.J. (2017). *What are major managerial dilemmas of digital transformation?* Retrieved August 21, 2017, from <http://dssresources.com/faq/index.php?action=artikel&id=386>



- Rickards, T., Smaje, K., & Sohoni, V. (2015). *Transformer in chief: The new chief digital officer*. Retrieved June 11, 2017, from <http://www.mckinsey.com/business-functions/organization/our-insights/transformer-in-chief-the-new-chief-digital-officer>
- Setia, P., Venkatesh, V., & Joglekar, S. (2013). Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance. *MIS Quarterly*, 37(2), 565–590.
- Tiersky, H. (2017). 5 top challenges to digital transformation in the enterprise. Retrieved January 20, 2018, from <https://www.cio.com/article/3179607/e-commerce/5-top-challenges-to-digital-transformation-in-the-enterprise.html>
- Trevor, J., & Varcoe, B. (2017). How aligned is your organization? *Harvard Business Review*. Retrieved August 20, 2017, from <https://hbr.org/2017/02/how-aligned-is-your-organization>
- Westerman, G., Bonnet, D., & McAfee, A. (2012). The advantages of digital maturity. *MIT Sloan Management Review*. Retrieved July 21, 2017, from <http://sloanreview.mit.edu/article/the-advantages-of-digital-maturity/>
- Westerman, G., Bonnet, D., & McAfee, A. (2014). The nine elements of digital transformation. *MIT Sloan Management Review*. Retrieved June 11, 2017, from <http://sloanreview.mit.edu/article/the-nine-elements-of-digital-transformation/>