The Way Forward: A Practical Guideline for Successful Digital Transformation

Elena Parmiggiani and Patrick Mikalef

Abstract This chapter presents key lessons learned and implications for practice resulting from the analysis of the empirical cases included in this book. We map emerging themes across five layers: unit or project, organization, organization ecosystem, ethical and environmental sustainability, and society. We identify two emerging trends: the co-evolution of organizational forms and new technologies and the fact that digital transformation increasingly happens on the organizational ecosystem level. This has consequences in terms of increased data work, new work processes, and the need to actively engage with sustainability policies. We highlight the need for a focus on the long-term effects of digital transformation initiatives with attention to their ripple effects over time.

1 Emerging Research Directions: A Way Forward

The aim of this book has been to present the theme of digital transformation and draw trajectories and present reflections along the journey in Norway so far. We started in Chap. 1 by pointing to the contextual nature of digital transformation, where its successful outcome is often the result of a jigsaw puzzle where bits that come in many "shapes and sizes" have to be combined and made to fit in a specific context. In the case of Norway, we observed that the evolution of ICT systems and infrastructures has been largely driven by pragmatic concerns related to specific applications, aimed to ensure the competitiveness of industrial and service

E. Parmiggiani (✉)
Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway
e-mail: parmiggi@ntnu.no

P. Mikalef
Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway

Department of Technology Management, SINTEF Digital, Trondheim, Norway
e-mail: patrick.mikalef@sintef.no

P. Mikalef, E. Parmiggiani (eds.), *Digital Transformation in Norwegian Enterprises*,
https://doi.org/10.1007/978-3-031-05276-7_11

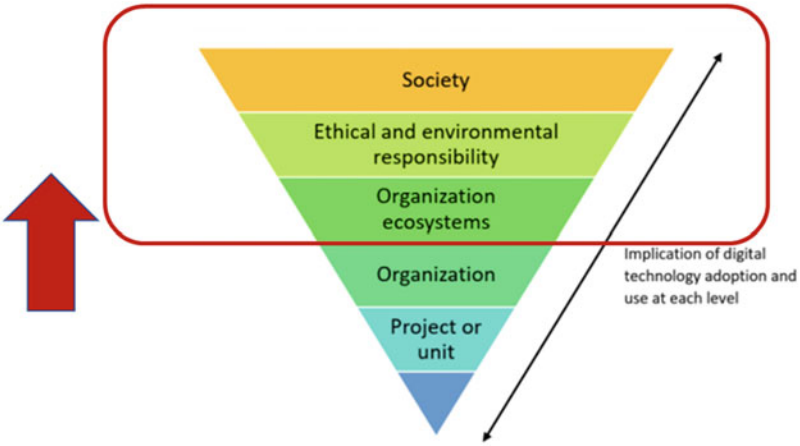

Fig. 1 Digital transformation unfolding at different organizational and social levels

organizations in the country against a very dynamic global market. Interestingly, this has also happened through public-private initiatives. A crucial aspect in this process is indeed the role of the state in maintaining a trust-based relation with its citizens and organizations, for example, by investing significantly in the digitalization of its public services as highlighted in Chap. 2. Chapters 3–9 contribute to further nuancing this picture and surfacing additional aspects across a variety of domains.

The most important observation that follows from the studies presented in the previous chapters is that digital transformation unfolds at different levels, moving from the unitary or project level, up toward organizations, and increasingly happening on the level of ecosystems of organizations, with implications for ethical and environmental concerns and for society at large (Fig. 1).

In the remainder of this chapter, we elaborate on the practical implications of this message based on a meta-analysis of the cases presented in this book. The emerging themes relate to different levels in Fig. 1 and are tightly interlinked as illustrated in Fig. 2.

On the level of single organizations, a first implication of the studies presented in this book is the *co-evolution of organizational forms and digital technologies.* In practical terms, this means that ways of working and digital technology influence and change each other. In general terms, this is not a new observation, as the fields of Information Systems (IS) and organization studies have long demonstrated [1, 2]. What is new in the current landscape is that successful digital transformation seems to be associated with the ability of aligning the way work and data are organized [3]. More in general, *organizations should plan for fluid and goal-oriented work practices, as opposed to rigid, department-based structures*. A vivid illustration of this is the case of the Norwegian Labor and Welfare Organization presented in Chap. 7, in which agile, project-based teams are replacing

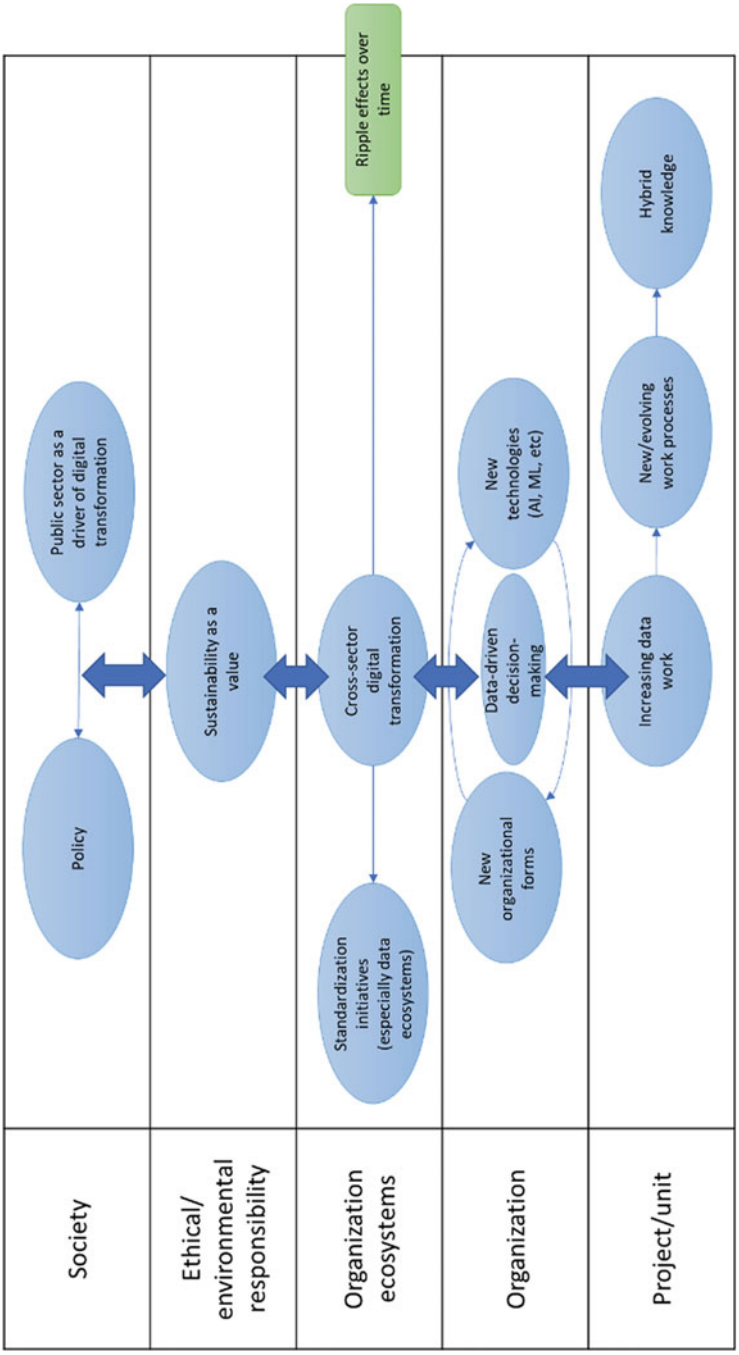

Fig. 2 Map of the emerging themes (represented with blue bubbles) and the corresponding organizational and societal level

a silo-based data and work structures, in connection with the implementation of a new digital platform.

The purposeful tuning of organizational forms and new technologies is a key enabler of data-driven digital transformation. This is particularly the case when some work processes become semi- or fully automated by means of novel algorithms and dashboards over time, as the cases of healthcare (Chap. 9), utility (Chap. 5), and oil and gas service (Chap. 6) demonstrate. On the level of single units or projects, data-driven algorithms (e.g., fueled by AI or ML) can learn from the available data, generate evolving results, and let new phenomena become visible as a result of that process [4]. In this process, the space between human and algorithmic work gives birth to increasingly hybrid [5] or meta-human [6] systems which are substantially changing the organization of work. A reason for this is that data-driven algorithms tend to work poorly when the underlying human knowledge work is characterized by high uncertainty, as research into the application of AI/ML tools in medical work shows [7]. However, this space is a still largely untapped source of value as digital transformation seems often to imply *increased data work* for employees [8, 9]. For organizations, harnessing the co-evolution of work processes and data-driven algorithms is an issue of governance, and new, flexible governance strategies are required to create business value [10].

Moving up in Fig. 2, *we observe that digital transformation increasingly happens at the level of organization ecosystems*. In other words, digital transformation not only involves single, innovative organizations but is a concerted process involving different public and/or private organizations operating in a sector or market segment, as is currently happening in the case of the oil and gas domain (Chap. 3). This has led to the development of data-driven service ecosystems, in which innovation practices do not only involve new technological and architecture solutions but the alignment of different actors who collaborate [11] around practical concerns [12]. Organizations should therefore consider synergizing with competitors in a particular sector in a more systematic way in order to promote the development of shared means (such as data infrastructures and platforms). Evidence demonstrates that sharing data across organizational boundaries creates positive network externalities for organizations, something which is currently leveraged by the Norwegian government in promoting an open data sharing policy (Chap. 2). These new means—as opposed to end products—become the new paths to create value and enhance organizational identity [13, 14] and value chains. For researchers, this could lead to further conceptualizing the blurred spaces between competition and collaboration in digital transformation.

An important corollary of this observation is that *organizations should perform a long-term analysis of the longitudinal, ripple effects associated with the consequences of the emergence of service ecosystems*. Orlikowski and Scott [15] show that cross-sector digital transformation processes transform business activities, and, in doing so, they tend to become disconnected from existing industry and service standards. On the long-term, the emerging new value chains generate new, de facto standards with surprising consequences for incumbent organizations and for society who adopt the digital products resulting from the new standards.

For researchers, this is an invitation to carry out longitudinal studies of digital transformation or historical reconstructions to capture the long-term trends and consequences of current digitalization initiatives. Chapters 3 and 4 in this book provide two examples in this direction.

Finally, *the societal, ethical, and environmental aspects are increasingly a core value for businesses that must be embraced in the fight against climate change and social inequalities*. For organizations, this warrants increased cooperation with national and supranational (e.g., the EU) governments on policy-related issues. In the public sector, this is evident in the ongoing investment in improving, for example, mobility services (Chap. 8). In this regard, the well-established cooperation between Norwegian organizations and the Norwegian government might be an inspiration (see Chap. 2).

For researchers, this requires a more explicit focus on what Jackson and colleagues call the "policy knot," namely, refrain from thinking of emerging technologies as an ex post solution to emerging ethical/environmental problems, but unpack how policy influences and impacts the design of new technologies and work practices [16]. Promising work in this direction is done in the Green IS field [17], but more research is needed to contribute to policy and politics [18].

To conclude, the journey of digital transformation in Norway illustrates that digital technology implementation and use overflow each of the layers and cut across at all other levels in Fig. 2. In sum, the most important message for future practice of digital transformation is therefore to take seriously the long-term ripple effects of digitalization initiatives across sectors and domains.

References

1. Orlikowski, W. J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science, 11*, 404–428.
2. Baptista, J., Stein, M.-K., Klein, S., Watson-Manheim, M. B., & Lee, J. (2020). Digital work and organisational transformation: Emergent Digital/Human work configurations in modern organisations. *The Journal of Strategic Information Systems., 29*, 101618. https://doi.org/10.1016/j.jsis.2020.101618
3. Alaimo, C., & Kallinikos, J. (2022). Organizations decentered: Data objects, technology and knowledge. *Organization Science, 33*, 19–37. https://doi.org/10.1287/orsc.2021.1552
4. Monteiro, E., & Parmiggiani, E. (2019). Synthetic knowing: The politics of internet of things. *MIS Quarterly., 43*, 167–184.
5. van den Broek, E., Sergeeva, A., & Huysman, M. (2021). WHEN THE MACHINE MEETS THE EXPERT: AN ETHNOGRAPHY OF DEVELOPING AI FOR HIRING. *MIS Quarterly, 45*.
6. Lyytinen, K., Nickerson, J. V., & King, J. L. (2020). Metahuman systems = humans + machines that learn. *Journal of Information Technology*. https://doi.org/10.1177/0268396220915917
7. Lebovitz, S., Levina, N., & Lifshitz-Assa, H. (2021). Is AI ground truth really true? The dangers of training and evaluating AI tools based on experts' know-what. *MISQ., 45*, 1501–1526. https://doi.org/10.25300/MISQ/2021/16564

8. Bossen, C., Pine, K. H., Cabitza, F., Ellingsen, G., & Piras, E. M. (2019). Data work in healthcare: An introduction. *Health Informatics Journal, 25*, 465–474. https://doi.org/10.1177/1460458219864730
9. Parmiggiani, E., Terracino, E. A., Huysman, M., Jones, M., Mueller, B., & Mikalsen, M. (2020). OASIS 2019 Panel Report: A glimpse at the 'Post-Digital'. *Communications of the Association for Information Systems, 47*, 583–596.
10. Mikalef, P., Pateli, A., & van de Wetering, R. (2020). IT architecture flexibility and IT governance decentralisation as drivers of IT-enabled dynamic capabilities and competitive performance: The moderating effect of the external environment. *European Journal of Information Systems, 0*, 1–29. https://doi.org/10.1080/0960085X.2020.1808541
11. Nambisan, S. (2018). Architecture vs. ecosystem perspectives: Reflections on digital innovation. *Information and Organization, 28*, 104–106. https://doi.org/10.1016/j.infoandorg.2018.04.003
12. Parmiggiani, E., & Monteiro, E. (2016). A measure of 'environmental happiness': Infrastructuring environmental risk in oil and gas off shore operations. *Science & Technology Studies, 29*, 30–51.
13. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*. https://doi.org/10.1016/j.jsis.2019.01.003
14. Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2020). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems.*
15. Scott, S. V., & Orlikowski, W. J. (2021). The digital undertow: How the corollary effects of digital transformation affect industry standards. *Information Systems Research*.
16. Jackson, S. J., Gillespie, T., & Payette, S. (2014). The policy knot: Re-integrating policy, practice and design in CSCW studies of social computing. In *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing* (pp. 588–602). ACM. https://doi.org/10.1145/2531602.2531674
17. Watson, R., Elliot, S., Corbett, J., Farkas, D., Feizabadi, A., Gupta, A., Iyer, L., Sen, S., Sharda, R., Shin, N., Thapa, D., & Webster, J. (2021). How the AIS can improve its contributions to the UN's sustainability development goals: Towards a framework for scaling collaborations and evaluating impact. *Communications of the Association for Information Systems., 48*. https://doi.org/10.17705/1CAIS.04841
18. King, J., & Kraemer, K. (2019). Policy: An information systems frontier. *Journal of the Association for Information Systems., 20*, 842–847. https://doi.org/10.17705/1.jais.00553