Machine Learning and Artificial Intelligence J.-L. Kim (Ed.) © 2023 The authors and IOS Press. This article is published online with Open Access by IOS Press and distributed under the terms of the Creative Commons Attribution Non-Commercial License 4.0 (CC BY-NC 4.0). doi:10.3233/FAIA230773

Contribution to a Better Digital Transformation Implementation: An Integrative Approach

Houda MAHBOUB^{a,1} and Hicham SADOK^b

^a Mohammed V University in Rabat, Business and Economics department, Rabat, 6430, Morocco

^b Mohammed V University in Rabat, Business and Economics department, Rabat, 6430, Morocco

Abstract. Digital transformation is one of the major challenges thrown up with the technological and societal evolution of recent years. It represents an interesting research area nowadays, especially with its increasing number of papers in this field. However, the current literature approaches the implementation of digital transformation in a fragmented way. In addition, several managers report their inability to succeed in the digital transition due to a lack of visibility and a non-existent integrative approach. To overcome these limits, this work proposes a transversal and integrative approach to the implementation of digital transformation and its main stages. We suggest adding the integration of the PDCA approach into the whole process of digital transformation to optimize the results of this transformation. Thus, this work can serve as a guide for any company wishing to consider a technological investment and digital transformation project.

Keywords. Digital transformation, implementation, integrative approach, continuous improvement.

1. Introduction

The companies' digital transformation (DT) remains a reality that has upset several aspects nowadays: employment, processes and procedures, work modes, organizational culture, and many others. Its impacts differ from one industry to another: tourism, banking, industrial ... Nevertheless, this paradigm is no longer a trend as it was the case in the last years, but an obligation [1]. With the emergence of the Covid-19 health crisis, many States and Companies became more interested in DT and tried to take advantage of it to develop a competitive advantage. The latter will allow them to grow their resilience but also to guarantee their survival in the face of uncertainty and unexpected events. Despite its strong impact on organizational performance and decision-making [2], many companies aren't yet able to properly implement digital transformation. This is due to the lack of a transversal approach to digital transformation implementation, that includes the most important points to consider and the steps to follow. The existing literature, both theoretical and empirical, only offers a fragmented version that does not

¹ Corresponding Author: Houda MAHBOUB, Business and Economics Department, FSJES Souissi, Mohammed V University in Rabat, Rabat, Morocco; E-mail: houda.mahboub@um5r.ac.ma.

guarantee a certain fluidity and clarity for managers. Thus, our work aims to respond to this constraint to enrich the literature, but also to serve as a guide for companies looking to embark on this adventure or even for those who have already started this journey.

2. The digital transformation challenge: a literature review

As one of the harshest challenges menacing the organizational survivor, digital transformation (DT) is on the mind of all managers. With the increasing evolution of digital technologies, and especially the disruptive changes they induce in all companies and industries, several researchers gained interest in this research area for a better understanding of this revolution [3]. However, this concept remains fuzzy due to the existence of several definitions. In general, it refers to "the use of technology to radically improve performance or reach of enterprises" [4, 5]. Other researchers [6, 7] see that it represents "the use of new digital technologies, such as social media, mobile, analytics or embedded devices, to enable major business improvements like enhancing customer experience, streamlining operations or creating new business models". If we analyze both definitions, we can see that both of them identify DT as a tool to improve organizational performance through the use of digital technologies [8]. On the other hand, Demirkan and al [9] define DT as "the profound and accelerating transformation of business activities, processes, competencies, and models to fully leverage the changes and opportunities brought by digital technologies and their impact across society in a strategic and prioritized way". This definition joins the one provided by Verhoef and al. [10], which considers DT as a kind of implementation of a series of technologies and human changes to restructure the existing managerial models and culture. This approach seems more interesting since it provides a larger perception of digital transformation. It doesn't only treat it from a performance improvement vision but rather outlines how the latter can achieve this goal. Also, the Verhoef and al definition introduces the cultural aspect which differentiates between the three levels of the digital transition. Despite the notable progress of research on digital transformation, there is still a lack of understanding of this phenomenon [11-14], especially in terms of its practical application in organizational aspects [15]. Indeed, almost 90% of companies fail to implement their DT project [16]. Additionally, orientations on how to implement digital transformation concretely in organizations remain fragmented [17]. The current literature and empirical results only deal with certain aspects of the digital transformation project [13, 16, 18]. To exceed this research gap, our work provides a conceptual model that presents an integrative approach to digital transformation implementation.

3. Overcoming the hurdle of implementing digital transformation: a conceptual model

With the continuous evolution of digital, it remains vital to succeed in this challenge. However, this goal is not easy at all. Requiring internal changes in processes, strategy and business model, and cultural changes, managers find themselves in a striving endeavor between making internal changes and meeting the ever-changing external needs of customers. Thus, having a roadmap guiding the implementation of digital transformation is very beneficial while managers will simply contextualize it and tackle the external part of this transition. By conducting a forward-looking literature review, the fragmented analysis of this challenge remains clear. Studies are content to focus on a single aspect of digital transformation. Nevertheless, the absence of an integrative approach does not guarantee coherence between all the actions undertaken in the framework of this implementation project. Indeed, it is this lack of coordination that leads to failure in this challenge and reduces the quality of the project [15]. Indeed, Parviainen and al. addressed this point in their work in 2017 [19], but their proposed model concern only the digitalization stage. Our work gives a response to these issues by providing a conceptual model that clarifies the major steps to implementing DT and adds other key aspects to take into consideration, outlying thus an integrative approach to DT. Our proposed model (Figure 1.) can be considered an improved version of the Parviainen and al. model, but more likely a continuum of their work since it deals with the digital transformation instead of the digitization stage.



Figure 1. The digital transformation implementation proposed approach.

To start the adventure of DT implementation, the company starts with an analysis of the DT's potential impacts and motivation to understand the contribution of this project and an anticipated projection of its future. After that, a diagnosis of the current situation remains important to know the strengths and threats of the company, but also to be aware of the actual potential and then comes the definition of the required situation to achieve. Once these elements become clear, the company needs to define the key actions to undertake, but also the key performance indicators to keep an eye on this project's evolution. The last stage concerns the concretization of these actions to ensure DT implementation, but also the conduction of a diagnosis to detect the successful changes and the missing points to correct. The model is used iteratively to gradually build the solution and fine-tune the digital goals and plans if needed. Its main steps are then examined in detail.

Step 1: Positioning the company in digital transformation

Before starting the adventure of DT implementation, the decision-maker must know the main motivation for this digital transition. It is this fuel that will serve as a guide for the definition of future actions and corrections that converge to goal achievement. Once the company's motivation is clear, the manager conducts a SWOT analysis and tries to project the potential impacts arising from each scenario that the company might face. These impacts are compared with risks, costs, and benefits to give a judgment on the project's feasibility.

Step 2: Review of the current state

Once the company is sure of its will to implement the digital transformation, it remains important to outline a diagnosis of the organizational current situation. This diagnosis implies the main areas to be impacted internally such as processes and resources and, externally such as customers, competitors, and external resources. After that, this current situation must be compared with the required future state to get an idea of the weight of the changes to conduct. It also helps to judge the success probability of the DT's implementation project.

Step 3: Roadmap for digital transformation

This stage remains crucial since it has a huge impact on the success of this adventure. In this step, the company translates its DT motivation into concrete actions. Therefore, a definition of the digital transformation strategy is followed by the proposition of a clear roadmap that will provide goal achievement while respecting the organizational situation (i.e. budget) and needs. This roadmap must contain actions that tend to reduce the gap between the current and required situations. For internal issues, the company adjusts continuously the actions to implement based on the detected errors (hiring new competencies, investing in employees' training, reducing cultural resistance ...). When it comes to external concerns, the company must propose adjustments that will satisfy customers' needs (new products and markets for example). Then, a definition of the key performance indicators (KPI) is integrated into the roadmap to be able to judge instantly the evolution of this project.

Step 4: Implementation with the technical support

Once all the past stages are passed successfully, and the roadmap is ready for concretization, the implementation step takes place. In this phase, all functions, and especially the technical team start executing the digital transformation strategy and the defined actions. After that, the company must apply the key performance indicators, to detect errors and required corrections to improve this project's performance, but also to detect if the forecast situation is reached. In this sense, the continuous improvement logic must take place through the PDCA approach. The latter involves four main steps: "Plan" where the company proposes future actions to implement in the "Do" stage. After that comes the "Check" phase where the company controls the respect of the desired actions and the achievements of the initial goals. If this stage points out negative results, it is important to move to the "Act" step by concretizing some corrective actions to improve overall performance. After that, the company continues to switch between the Check and Act to the point where the principal goal and outcomes are achieved. In the case of negative or positive "Check" results, the company moves to the "Plan" stage again, but with a new goal and actions this time. However, the DT success is also limited by several roadblocks. First, the lack of mastery and understanding of the working way of these new technologies represents a principal limitation [20]. Additionally, resistance, the lack of strategy, reduced technical competencies, inadequate corporate structures, and cultures, poor visibility of return on investment (ROI) [21], the lack of organizations 'preparation [22], silo structure, poor communication, rigidity and the bulk of rules and formalization [23] are the major limitations to a successful DT implementation. To enhance its effectiveness, companies must manage all these issues to attend a higher digital maturity level. In general, every company interested in digital transformation implementation needs to get a clear understanding of the complete described process. Moreover, considering cultural aspects remains crucial to talk about a digital transformation, otherwise, the company will be more in a digitalization phase.

4. Conclusion

Digital transformation remains of great importance on an international scale. Affecting all business levels but also shaping the competition and classification of several companies, the DT represents a unique fuel for development but might also kill enterprises. Several managers had already understood the weight of this investment, but still are not capable of addressing it. In addition, the detached analysis and experiences limit the digital transformation implementation success since there is no integrative approach that ensures coherence between all organizational changes required by this adventure. Thus, our work presents a response to this limit through the explanation of a model on which companies can rely to implement their digital transition. The main effort to do by managers consists in the contextualization of this approach to fit their current situation.

This work responds to the call of several researchers [24–26] to provide a more integrated and cross-cutting view. In addition, it enriches the literature by providing a comprehensive model of digital transformation implementation instead of fragmented analyses. Our originality consists in integrating the study of the motivations of digital investment in the first steps of the digital transformation since a good understanding of the desired objective of this project guides the rest of the actions to implement, improving thus the organizational performance. The second originality lies in the proposal to implement the PDCA (Plan-Do-Check-Act) approach during all stages of the process. This approach ensures the coherence of all the steps, but also the concretization of corrective actions in each step instead of undertaking them only at the end. This implies the reduction of costs and efforts deployed and improves decision-making. The major limitation of our work is the lack of testing of our model, which can serve as a proposal for future research. In terms of managerial contributions, our work will serve as a guide for any company interested in digital transformation. Also, it offers an appropriate approach to this third stage of digital specifically. It thus integrates all the important points to be taken into consideration both in terms of implementation but also in terms of the business model and the digital strategy for better consistency.

References

- [1] Mahboub H, Sadok H. Towards a better digital transformation: learning from the experience of a digital transformation project. In: Bach Tobji MA, Jallouli R, Strat VA, Soares AM, Davidescu AA, editors. Digital Economy Emerging Technologies and Business Innovation [Internet]. Cham: Springer International Publishing; 2022 [cited 2022 Oct 21]. p. 203–14. (Lecture Notes in Business Information Processing; vol. 461). Available from: https://link.springer.com/10.1007/978-3-031-17037-9_15
- [2] Sadok H. How can inclusive growth be enabled from financial technology? 2021;21.

- [3] Sadok H, Sakka F, El Maknouzi MEH. Artificial intelligence and bank credit analysis: A review. Cogent Economics & Finance [Internet]. 2022 Dec 31 [cited 2023 Mar 26];10(1):2023262. Available from: https://www.tandfonline.com/doi/full/10.1080/23322039.2021.2023262
- [4] Bekkhus R. Do KPIs used by CIOs decelerate digital business transformation? The Case of ITIL. DIGIT 2016 Proceedings [Internet]. 2016 Dec 11; Available from: https://aisel.aisnet.org/digit2016/16
- [5] Karagiannaki A, Vergados G, Fouskas K. The impact of digital transformation in the financial services industry: insights from an open innovation initiative in fintech in Greece. MCIS 2017 Proceedings [Internet]. 2017 Sep 1; Available from: https://aisel.aisnet.org/mcis2017/2
- [6] Horlacher A, Klarner P, Hess T. Crossing boundaries: organization design parameters surrounding CDOs and their digital transformation activities. In 2016.
- [7] Singh A, Hess T. How chief digital officers promote the digital transformation of their companies. MIS Quarterly Executive [Internet]. 2017 Feb 28;16(1). Available from: https://aisel.aisnet.org/misqe/vol16/iss1/5
- [8] El Alami A, Sadok H, Elhaoud N. Cloud computing & the organizational performance different approach of assessment. In: 2015 International Conference on Cloud Technologies and Applications (CloudTech) [Internet]. Marrakech, Morocco: IEEE; 2015 [cited 2023 Mar 26]. p. 1–5. Available from: http://ieeexplore.ieee.org/document/7337007/
- [9] Demirkan H, Spohrer JC, Welser JJ. Digital Innovation and Strategic Transformation. IT Prof [Internet]. 2016 Nov [cited 2022 Jan 10];18(6):14–8. Available from: http://ieeexplore.ieee.org/document/7763741/
- [10] Verhoef PC, Broekhuizen T, Bart Y, Bhattacharya A, Qi Dong J, Fabian N, et al. Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research [Internet]. 2021 Jan [cited 2022 Jan 4];122:889–901. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0148296319305478
- [11] Gray J, Rumpe B. Models for the digital transformation. Softw Syst Model [Internet]. 2017 May 1 [cited 2023 May 21];16(2):307–8. Available from: https://doi.org/10.1007/s10270-017-0596-7
- [12] Kane GC. Digital Maturity, Not Digital Transformation [Internet]. 2017 Apr [cited 2023 May 21]. Available from: https://sloanreview.mit.edu/article/digital-maturity-not-digital-transformation/
- [13] Matt C, Hess T, Benlian A. Digital Transformation Strategies. Bus Inf Syst Eng [Internet]. 2015 Oct [cited 2021 Jul 6];57(5):339–43. Available from: http://link.springer.com/10.1007/s12599-015-0401-5
- [14] Vial G. Understanding digital transformation: A review and a research agenda. The Journal of Strategic Information Systems [Internet]. 2019 Jun [cited 2023 May 21];28(2):118–44. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0963868717302196
- [15] Mahboub H, Sadok H. Implementing enterprise digital transformation: a contribution to conceptual framework design. NBRI [Internet]. 2023 Mar 16 [cited 2023 Mar 26];14(1):35–50. Available from: https://www.emerald.com/insight/content/doi/10.1108/NBRI-06-2022-0067/full/html
- [16] Loonam J, Eaves S, Kumar V, Parry G. Towards digital transformation: Lessons learned from traditional organizations. Strategic Change [Internet]. 2018 Mar [cited 2023 Jun 24];27(2):101–9. Available from: https://onlinelibrary.wiley.com/doi/10.1002/jsc.2185
- [17] Balakrishnan R, Das S. How do firms reorganize to implement digital transformation? Strategic Change [Internet]. 2020 Sep [cited 2023 Jun 25];29(5):531–41. Available from: https://onlinelibrary.wiley.com/doi/10.1002/jsc.2362
- [18] Hess T, Matt C, Benlian A, Wiesböck F. Options for Formulating a Digital Transformation Strategy. MIS Quarterly Executive. 2015;15, 2:123–39.
- [19] Parviainen P, Tihinen M, Kääriäinen J, Teppola S. Tackling the digitalization challenge: how to benefit from digitalization in practice. IJISPM [Internet]. 2022 Feb 1 [cited 2022 Apr 27];5(1):63–77. Available from: https://revistas.uminho.pt/index.php/ijispm/article/view/3856
- [20] Hon WK, Millard C. Banking in the cloud: Part 1 banks' use of cloud services. Computer Law & Security Review [Internet]. 2018 Feb [cited 2022 Jan 7];34(1):4–24. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0267364917303722
- [21] Ebert C, Duarte CHC. Digital Transformation. IEEE Softw [Internet]. 2018 Jul [cited 2022 Jan 10];35(4):16–21. Available from: https://ieeexplore.ieee.org/document/8405624/
- [22] Gupta S. Organizational barriers to digital transformation. 2018.
- [23] De Smet A, Gagnon C. Organizing for the age of urgency. McKinsey; 2018.
- [24] Bérard C. Le processus de décision dans les systèmes complexes : une analyse d'une intervention systémique. [Montreal, QC]: Université du Québec à Montréal; 2009.
- [25] Elbanna S, Child J. Influences on strategic decision effectiveness: Development and test of an integrative model. Strat Mgmt J [Internet]. 2007 Apr [cited 2021 Jul 7];28(4):431–53. Available from: https://onlinelibrary.wiley.com/doi/10.1002/smj.597
- [26] Papadakis VM, Lioukas S, Chambers D. Strategic decision-making processes: the role of management and context. Strategic Management Journal [Internet]. 1998 [cited 2022 May 30];19(2):115–47. Available from: http://www.jstor.org/stable/3094060