

BENCHMARKING

JURNAL MANAJEMEN PENDIDIKAN ISLAM

DIGITAL TRANSFORMATION IN ISLAMIC EDUCATIONAL INSTITUTIONS OF PAKISTAN: OPPORTUNITIES AND MANAGERIAL CHALLENGES

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Abstract

Digital transformation has become a strategic imperative for educational institutions worldwide, yet its adoption within Islamic educational institutions in Pakistan remains limited and under-researched. This study examines the opportunities and managerial challenges associated with digital transformation and tests its effect on institutional performance. Grounded in the Technology Acceptance Model and the Technology–Organization–Environment framework, a quantitative, cross-sectional design was adopted. Data were collected through a structured questionnaire from 305 administrators, teachers, and academic staff working in Madaris, Islamic universities, and Islamic schools, using a five-point Likert scale. Descriptive statistics, reliability analysis, Pearson correlation, and multiple regression were performed using SPSS. The results indicate that digital transformation, technological infrastructure, and managerial support significantly and positively predict institutional performance, while managerial challenges exert a significant negative influence. Together, the predictors explained 56% of the variance in institutional performance. The findings suggest that digitalization improves educational quality, administrative efficiency, accessibility, and competitiveness, but its benefits are constrained by resistance to change, limited digital competency, financial constraints, and inadequate infrastructure. The study contributes context-specific evidence for educational technology management in faith-based institutions and offers practical guidance for policymakers and administrators.

Keywords: Digital Transformation, Institutional Performance, Managerial Challenges, Technology Adoption.

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INTRODUCTION

Digital transformation (DT) has emerged as one of the most consequential forces reshaping the contemporary educational landscape. It is widely understood not merely as the adoption of new tools, but as a profound, organization-wide reconfiguration of

processes, competencies, and value-creation models enabled by combinations of information and communication technologies (Vial, 2019). Across higher education systems, the fourth industrial revolution and the disruptions of the COVID-19 pandemic accelerated the integration of learning management systems, online assessment, and digital administration, forcing institutions to respond rapidly and strategically (Benavides et al., 2020; Alenezi, 2021). In this environment, the capacity of an institution to transform digitally is increasingly treated as a determinant of its quality, efficiency, and long-term competitiveness.

The opportunities created by digital transformation in education are well documented. Digitalization can improve educational quality through interactive and personalized learning, enhance administrative efficiency by automating routine processes, widen accessibility for geographically dispersed learners, and strengthen the competitive positioning of institutions in a crowded market (Alenezi, Wardat, & Akour, 2023; Mohamed Hashim, Tlemsani, & Matthews, 2022). Emerging tools such as immersive and virtual-reality environments further extend these pedagogical possibilities (Asad, Naz, Churi, & Tahanzadeh, 2021). However, the literature also consistently emphasizes that these benefits are not automatic. Success depends heavily on leadership, organizational readiness, and the management of human and infrastructural barriers, with a substantial proportion of transformation efforts failing when they are poorly managed (Benavides et al., 2020; Rodríguez-Abitia & Bribiesca-Correa, 2021).

Islamic educational institutions occupy a central position in Pakistan's educational and social fabric. These institutions span a continuum that includes traditional madaris (religious seminaries), Islamic universities, and Islamic schools that combine religious and contemporary curricula. They serve millions of learners and preserve a centuries-old scholarly tradition, yet many continue to rely on conventional pedagogical and administrative practices (Iqbal, Yousaf, Shaheen, & Nisa, 2023; Rafiq-uz-Zaman, 2022). As the surrounding educational ecosystem digitalizes, these institutions face growing pressure to modernize their teaching, communication, and management systems while remaining faithful to their values (Indra, 2020; Sholeh, 2023).

The scale of this sector is empirically substantial rather than merely rhetorical. Pakistan's first Economic Census, compiled alongside the 2023 Population and Housing Census, enumerated 36,331 madaris in addition to approximately 242,000 schools, 11,568 colleges, and 214 universities (Pakistan Bureau of Statistics, 2025). Pakistan Education Statistics 2023–24 records total national enrolment of 58.3 million learners and counts deeni madaris within that total, with madaris enrolment estimated at approximately 3.3 million students, of whom about 1.82 million (55.9%) are female (Pakistan Institute of Education, 2024). On these figures, Islamic educational institutions form a numerically significant and nationally distributed subsystem, so their level of digital readiness carries measurable consequences for the education system as a whole.

The digital conditions under which these institutions operate can likewise be quantified, and those quantities define the problem this study addresses. At the national level, internet penetration stood at 45.6% of the population, equivalent to approximately 117 million users, in late 2025 (DataReportal, 2026), even though telecommunications coverage now exceeds 92% of the population, broadband connections have passed 150 million, and 95% of cellular networks are 4G-enabled (Pakistan Telecommunication Authority, 2025). Connectivity inside educational institutions is markedly weaker than these headline figures imply: only about 65% of schools nationally have access to electricity, a proportion that falls to 59% at the primary level and to 21% in Balochistan (Pakistan Institute of Education, 2024). Human capability presents a parallel constraint, with national literacy at 63% and numeracy at 79%, but with only a limited share of youth

and adults demonstrating strong information and communication technology skills, a pattern officially characterized as a digital skills gap (Government of Pakistan, 2026).

Read together, these statistics establish the research problem in measurable terms: national digital capacity has expanded rapidly, yet a substantial share of educational institutions cannot convert that capacity into usable teaching and administrative capability because of deficits in physical infrastructure and in human digital competency. The gap between available national infrastructure and institution-level utilization is precisely what the present study models, and it is the reason the analysis specifies technological infrastructure, managerial support, and managerial challenges as distinct constructs alongside digital transformation itself. Framing the background in these quantitative terms also aligns the introduction with the quantitative, cross-sectional design reported in the Research Method section.

Despite the breadth of research on digital transformation in mainstream higher education, comparatively little empirical work has examined its adoption within Islamic educational institutions in Pakistan, particularly from a managerial perspective. Existing studies highlight persistent barriers in these institutions including resistance to change, limited digital skills, financial constraints, and inadequate technological infrastructure but rarely model how these factors jointly affect institutional performance (Iqbal et al., 2023; Sholeh, 2023; Rafiq-uz-Zaman, 2022). This study addresses that gap by quantitatively examining both the opportunities and the managerial challenges of digital transformation, and by estimating their combined influence on institutional performance.

The study is grounded in two complementary theories. The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use shape individuals' attitudes and behavioral intention to adopt technology (Davis, 1989), with later extensions incorporating social influence and organizational processes (Venkatesh & Davis, 2000) and a unified view of adoption determinants (Venkatesh, Morris, Davis, & Davis, 2003). The Technology–Organization–Environment (TOE) framework complements TAM by situating adoption within technological, organizational, and environmental contexts (Tornatzky & Fleischer, 1990). Drawing on these perspectives, the study conceptualizes digital transformation, technological infrastructure, and managerial support as independent variables influencing institutional performance (the dependent variable), while managerial challenges function as an inhibiting factor. These hypothesized relationships are summarized in the conceptual model presented in Figure 1. Accordingly, the study pursues four objectives:

- To assess the level of digital transformation, technological infrastructure, and managerial support in Islamic educational institutions in Pakistan;
- To examine the effect of digital transformation, technological infrastructure, and managerial support on institutional performance;
- To examine the effect of managerial challenges on institutional performance; and
- To determine the extent to which these factors jointly explain institutional performance.

These objectives translate into four research questions.

Research Question 1: What is the level of digital transformation, technological infrastructure, and managerial support in Islamic educational institutions in Pakistan?

Research Question 2: Do digital transformation, technological infrastructure, and managerial support significantly and positively affect institutional performance?

Research Question 3: Do managerial challenges significantly and negatively affect institutional performance?

Research Question 4: To what extent do these factors jointly explain institutional performance?

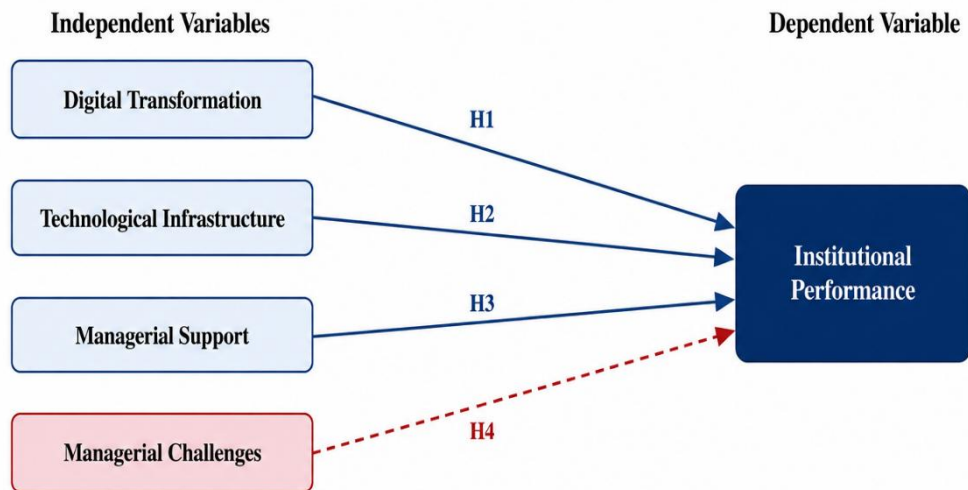
To address Research Question 2 and Research Question 3, the following hypotheses are tested:

H₁: Digital transformation positively affects institutional performance;

H₂: Technological infrastructure positively affects institutional performance;

H₃: Managerial support positively affects institutional performance; and

H₄: Managerial challenges negatively affect institutional performance.



Source: Authors own creation

Figure 1. Conceptual Model of the Research

The significance of the study is both theoretical and practical. Theoretically, it extends the application of TAM and the TOE framework to a faith-based educational context that remains under-explored in the digital transformation literature. Practically, it offers evidence to guide policymakers, administrators, and educational technologists in designing realistic, value-sensitive digitalization strategies for Islamic educational institutions in Pakistan.

RESEARCH METHOD

This study adopted a positivist research philosophy and a deductive approach, employing a quantitative, cross-sectional survey design to test the hypothesized relationships. The cross-sectional design was appropriate because the objective was to measure perceptions and associations among variables at a single point in time rather than to track change longitudinally.

The target population comprised administrators, teachers, and academic staff working in Islamic educational institutions in Pakistan, including madaris, Islamic universities, and Islamic schools. Because a complete sampling frame for this diffuse population was unavailable, a combination of simple random sampling within accessible institutions and convenience sampling across institution types was used. The minimum sample size was justified using the Krejcie and Morgan (1970) criterion for large populations, which recommends approximately 384 respondents at a 95% confidence level. A total of 380 questionnaires were distributed; 320 were returned and, after screening for incomplete responses, 305 valid responses (a usable response rate of 80.3%) were retained for analysis.

Primary data were collected through a structured, self-administered questionnaire developed from previously validated instruments and adapted to the study context (Davis, 1989; Benavides et al., 2020; Alenezi, 2021). The questionnaire comprised six sections. Section A captured demographic information (gender, age, qualification, job position, institution type, and experience). Sections B to F measured the study constructs: Section B, digital transformation (6 items); Section C, technological infrastructure (5 items); Section D, managerial support (5 items); Section E, managerial challenges (6 items); and Section F, institutional performance (6 items). All substantive items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data were analyzed using SPSS. Descriptive statistics (means, standard deviations, frequencies) summarized respondents' profiles and perceptions. Reliability was assessed using Cronbach's alpha, with values of $\alpha \geq 0.70$ considered acceptable. Pearson correlation examined the bivariate relationships among the constructs, and multiple linear regression tested the hypothesized effects on institutional performance. The estimated regression model is specified as $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$, where Y is institutional performance, X_1 is digital transformation, X_2 is technological infrastructure, X_3 is managerial support, and X_4 is managerial challenges.

RESEARCH RESULTS AND DISCUSSION

Research Results

The demographic profile of the 305 respondents is summarized in Table 1. The sample was predominantly male and concentrated among teaching staff, reflecting the staffing composition typical of Islamic educational institutions in Pakistan. Respondents were distributed across madaris, Islamic universities, and Islamic schools, providing reasonable coverage of the three institution types.

Table 1.
Demographic Profile of Respondents (N = 305)

Variable	Category	Frequency	Percentage
Gender	Male	195	63.9%
	Female	110	36.1%
Age (years)	20–30	78	25.6%
	31–40	121	39.7%
	41–50	76	24.9%
	Above 50	30	9.8%
Qualification	Bachelor	64	21.0%
	Master	158	51.8%
	MPhil/PhD	83	27.2%
Job Position	Administrator	71	23.3%
	Teacher	168	55.1%
	Academic staff	66	21.6%
Institution Type	Madaris	132	43.3%
	Islamic university	89	29.2%
	Islamic school	84	27.5%
Experience	Below 5	96	31.5%

5–10	124	40.7%
Above 10	85	27.9%

Source: Created by the authors.

Table 2 reports the reliability and descriptive statistics for the study constructs. All Cronbach's alpha values exceeded the 0.70 threshold, ranging from 0.82 to 0.89, confirming the internal consistency of the measurement scales. The mean scores indicate that respondents perceived comparatively high levels of managerial challenges ($M = 3.89$) and digital transformation ($M = 3.78$), while technological infrastructure recorded the lowest mean ($M = 3.21$), signaling infrastructural limitations. These descriptive levels address the first research question (RQ1).

Table 2.
Reliability and Descriptive Statistics

Construct	Items	Mean	SD	α
Digital Transformation	6	3.78	0.74	0.88
Technological Infrastructure	5	3.21	0.86	0.84
Managerial Support	5	3.52	0.80	0.86
Managerial Challenges	6	3.89	0.71	0.82
Institutional Performance	6	3.65	0.77	0.89

Source: Created by the authors.

The correlation results in Table 3 show that digital transformation, technological infrastructure, and managerial support were each positively and significantly correlated with institutional performance, with digital transformation exhibiting the strongest association ($r = .66$, $p < .01$). Managerial challenges were significantly and negatively correlated with institutional performance ($r = -.44$, $p < .01$), consistent with the expected inhibiting role.

Table 3.
Correlation Matrix

Variables	1	2	3	4	5
1. Digital Transformation	1				
2. Technological Infrastructure	.54**	1			
3. Managerial Support	.49**	.47**	1		
4. Managerial Challenges	-.38**	-.41**	-.35**	1	
5. Institutional Performance	.66**	.58**	.52**	-.44**	1

Note: ** $p < .01$.

Source: Created by the authors.

The multiple regression results are presented in Table 4. The model was statistically significant, $F(4, 300) = 95.4$, $p < .001$, and explained 56% of the variance in institutional performance ($R^2 = .56$, adjusted $R^2 = .55$). Digital transformation was the strongest positive predictor ($\beta = .41$, $p < .001$), followed by technological infrastructure ($\beta = .24$, $p < .001$) and managerial support ($\beta = .18$, $p = .001$). Managerial challenges had a significant negative effect ($\beta = -.16$, $p = .002$). All four hypotheses were therefore supported.

Table 4.
Multiple Regression Results (DV = Institutional Performance)

H	Predictor	B	t	p	Decision
H ₁	Digital Transformation	.41	7.62	< .001	Supported
H ₂	Technological Infrastructure	.24	4.55	< .001	Supported
H ₃	Managerial Support	.18	3.41	.001	Supported
H ₄	Managerial Challenges	-.16	-3.12	.002	Supported

Note: $R^2 = .56$; $F(4, 300) = 95.4$, $p < .001$.

Source: Created by the authors.

Discussion

The findings confirm that digital transformation is a significant positive driver of institutional performance in Islamic educational institutions in Pakistan. This result aligns with the broader literature, which links digitalization to improvements in educational quality, administrative efficiency, and competitiveness (Benavides et al., 2020; Alenezi, 2021; Mohamed Hashim et al., 2022). Interpreted through the Technology Acceptance Model, the strong effect of digital transformation suggests that, where staff perceive digital tools as useful and easy to use, adoption translates into tangible performance gains (Davis, 1989; Venkatesh & Davis, 2000).

The significant role of technological infrastructure is consistent with the TOE framework's emphasis on the technological context as a precondition for successful adoption (Tornatzky & Fleischer, 1990). Yet infrastructure also recorded the lowest mean in this study, indicating that limited connectivity, hardware, and platforms remain a binding constraint. This mirrors evidence from Pakistani institutions, where inadequate infrastructure and digital-divide effects repeatedly undermine technology integration (Iqbal et al., 2023; Rafiq-uz-Zaman, 2022).

Managerial support emerged as a positive predictor, underscoring that leadership and organizational commitment are decisive for transformation a conclusion strongly echoed in systematic reviews of digital transformation in higher education (Benavides et al., 2020; Rodríguez-Abitia & Bribiesca-Correa, 2021). Conversely, managerial challenges significantly depressed institutional performance. The high perceived level of these challenges ($M = 3.89$) reflects well-documented barriers in Islamic educational settings, including resistance to change, limited digital competency, and financial constraints (Sholeh, 2023; Indra, 2020). These barriers correspond to the organizational and environmental dimensions of the TOE framework and help explain why opportunities do not automatically yield results.

Taken together, the results portray digital transformation in Islamic educational institutions as a promising but conditional process. The opportunities are real and measurable, but they are conditioned on infrastructural adequacy and managerial capacity, and they are actively constrained by entrenched managerial challenges. This integrated reading combining the individual-level logic of TAM with the institutional-level logic of TOE offers a more complete account of digital transformation in faith-based institutions than either theory alone.

CONCLUSION

This study examined the opportunities and managerial challenges of digital transformation in Islamic educational institutions in Pakistan and tested their effect on institutional performance. The conclusions are fourfold. First, respondents reported

moderate-to-high levels of digital transformation and managerial support, but comparatively limited technological infrastructure. Second, digital transformation, technological infrastructure, and managerial support significantly and positively influence institutional performance, with digital transformation the strongest predictor. Third, managerial challenges resistance to change, limited digital competency, financial constraints, and inadequate infrastructure significantly weaken institutional performance. Fourth, the combined model accounts for a substantial share (56%) of the variance in performance, confirming that digitalization meaningfully improves educational quality and institutional effectiveness when supported, and is hindered when barriers persist. These four conclusions correspond directly to the study's four research questions, showing that opportunity and constraint operate simultaneously and that managerial readiness is the pivot between them.

SUGGESTIONS/RECOMMENDATIONS

Several practical recommendations follow from the findings. Policymakers should prioritize investment in digital infrastructure and connectivity for Islamic educational institutions, particularly madaris in underserved areas. Institutional leaders should strengthen managerial support by articulating a clear digital strategy, securing dedicated funding, and visibly championing adoption. Sustained, value-sensitive digital-competency training should be provided for administrators, teachers, and staff to reduce resistance to change and build confidence in new systems. Finally, change-management practices that respect the institutions' religious mission can help align digital initiatives with organizational culture.

The study is subject to limitations that also indicate avenues for future research. Its cross-sectional design and reliance on self-reported data limit causal inference, and its geographical coverage was restricted. Future studies could employ longitudinal designs to capture change over time, comparative designs contrasting public and private or madrasa and university settings, and mixed-method approaches to enrich the quantitative findings with deeper qualitative insight. Incorporating mediating variables such as resistance to change and digital competency would further refine understanding of how digital transformation shapes institutional performance.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the authors used Grammarly/ ChatGPT (5.5)/ QuillBot in order to check and improve the grammar, spelling, punctuation, and readability of the English-language text. The tool was used solely for language editing at the sentence level. It was not used to conceive the study, to design or adapt the research instrument, to collect or analyze the data, to produce any table or figure, to generate the interpretation, arguments, findings, or conclusions, or to locate, generate, or format any reference. After using this tool, the authors reviewed and edited every affected passage and take full responsibility for the entire content of the manuscript, including its originality, the accuracy and integrity of the data and the analysis, the correctness of all citations and references, and its compliance with the journal's publication-ethics requirements.

This declaration should be read together with the independent AI-detection report submitted to OJS. Any AI signal recorded in that report arises from sentence-level language editing of text authored by the researchers; responsibility for all substantive scholarly content of this article rests entirely with the named authors.

REFERENCES

- Alenezi, M. (2021). Deep dive into digital transformation in higher education institutions. *Education Sciences*, 11(12), 770. <https://doi.org/10.3390/educsci11120770>
- Alenezi, M. (2021). Deep dive into digital transformation in higher education institutions. *Education Sciences*, 11(12), 770. <https://doi.org/10.3390/educsci11120770>
- Alenezi, M., Wardat, S., & Akour, M. (2023). The need of integrating digital education in higher education: Challenges and opportunities. *Sustainability*, 15(6), 4782. <https://doi.org/10.3390/su15064782>
- Asad, M. M., Naz, A., Churi, P., & Tahanzadeh, M. M. (2021). Virtual reality as pedagogical tool to enhance experiential learning: A systematic literature review. *Education Research International*, 2021, 7061623. <https://doi.org/10.1155/2021/7061623>
- Benavides, L. M. C., Tamayo Arias, J. A., Arango Serna, M. D., Branch Bedoya, J. W., & Burgos, D. (2020). Digital transformation in higher education institutions: A systematic literature review. *Sensors*, 20(11), 3291. <https://doi.org/10.3390/s20113291>
- DataReportal. (2026). Digital 2026: Pakistan. Kepios. <https://datareportal.com/reports/digital-2026-pakistan>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Government of Pakistan. (2026). Pakistan economic survey 2025–26: Chapter 10 – Education. Finance Division. https://www.finance.gov.pk/survey/chapter_26/10_Education.pdf
- Indra, H. (2020). Challenges and response in Islamic education perspective in the digital media era. *Attarbiyah: Journal of Islamic Culture and Education*, 5(1), 31–42.
- Iqbal, M., Yousaf, M., Shaheen, A. K., & Nisa, Z. U. (2023). Barriers to modern education in madrasas of Pakistan: Student and teacher's perceptions. *Journal of Positive School Psychology*, 7(2), 31–40.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>
- Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and Information Technologies*, 27(3), 3171–3195. <https://doi.org/10.1007/s10639-021-10739-1>
- Pakistan Bureau of Statistics. (2025). First economic census of Pakistan (Population and Housing Census 2023). *Government of Pakistan*.
- Pakistan Institute of Education. (2024). Pakistan education statistics 2023–24. Ministry of Federal Education and Professional Training. <https://pie.gov.pk/SiteImage/Publication/PES%202024.pdf>
- Pakistan Telecommunication Authority. (2025). Annual report 2024–25. *Pakistan Telecommunication Authority*. <https://pta.gov.pk>

- Rafiq-uz-Zaman, M. (2022). Comprehensive review: Integration of ICT in madrassa education – Addressing institutional needs and challenges. *Inverge Journal of Social Sciences*, 1(1), 100–108. <https://doi.org/10.63544/ijss.v1i1.203>
- Rodríguez-Abitia, G., & Bribiesca-Correa, G. (2021). Assessing digital transformation in universities. *Future Internet*, 13(2), 52. <https://doi.org/10.3390/fi13020052>
- Sholeh, M. I. (2023). Technology integration in Islamic education: Policy framework and adoption challenges. *Journal of Modern Islamic Studies and Civilization*, 1(2), 82–100. <https://doi.org/10.59653/jmisc.v1i02.155>
- Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>