

Midocean University
College of Business Administration
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The impact of digital transformation on organizational
performance in Saudi companies

Prepared by:

Fahad Saleh A Al-Maghlouth

Student ID:

253002128

Supervised by:

Dr. Alfaisal Abdelhameed Mohamed

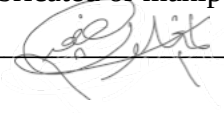
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AUTHOR'S DECLARATION

I declare that this thesis is my own academic work and that all ideas, evidence and words derived from other sources have been acknowledged through in-text citation and the reference list. The survey data, analysis and interpretation presented in this thesis are reported honestly and have not been fabricated or manipulated.

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ABSTRACT

This study investigated the relationship between employee-observed digital-transformation capabilities and perceived organizational performance in Saudi companies. A quantitative, cross-sectional survey produced 100 complete eligible responses from employees across non-managerial, supervisory, middle-management and senior-management levels. The model examined digital process integration, data-driven decision support, and employee digital enablement and change support as simultaneous predictors of a multidimensional performance outcome covering efficiency, quality, responsiveness, coordination, adaptability and overall effectiveness. Reliability was strong for all constructs (Cronbach's alpha = .800 to .913). Respondents reported moderately positive perceptions of the three digital capabilities and organizational performance. Multiple regression was significant, $F(3, 96) = 23.25$, $p < .001$, and explained 42.1% of the variance in perceived organizational performance. Digital process integration ($B = .243$, $p = .007$), data-driven decision support ($B = .275$, $p < .001$), and employee digital enablement and change support ($B = .271$, $p = .002$) were each significant positive predictors. The broad managerial-versus-non-managerial comparison was not significant ($p = .212$). The results indicate that organizational value is associated with the combined quality of connected processes, usable information and employee support rather than technology acquisition alone. Recommendations emphasize workflow integration, data ownership, practical training, user support, feedback mechanisms and benefit tracking. The cross-sectional self-report design supports associative, not causal, conclusions.

Keywords: Digital transformation; organizational performance; process integration; data-driven decisions; employee enablement; Saudi Arabia

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LIST OF ABBREVIATIONS

DDS — Data-driven decision support

DPI — Digital process integration

EDE — Employee digital enablement and change support

OLS — Ordinary least squares

POP — Perceived organizational performance

VIF — Variance inflation factor

CHAPTER ONE: GENERAL FRAMEWORK OF THE STUDY

1.1 Introduction and Background

Digital transformation is a process of change in which digital technologies, data and digitally enabled modes of working change the way an organization creates value and works. It extends beyond just software acquisition or automation of a single task. Vial (2019) defines digital transformation as an organizational response to disruptions caused by digital technologies and Verhoef et al. (2021) differentiate between digitization, digitalization, and digital transformation as gradually wider levels of change. This is significant because an organisation can have modern applications, but not necessarily use them in their day-to-day work, make decisions based on them, or allow staff to change their working practices. The present study thus measures three observable capabilities, rather than asking respondents if their employer is “digitally transformed” or not.

Digital process integration is the first. It is about the degree of support of digital systems in the core workflows and how they enable information exchange between the relevant units and how they minimize fragmented and duplicate work. Bharadwaj et al. (2013) state that the concept of digital business strategy is a concept that is “fuzzy” in terms of the traditional distinction between information technology and business strategy. On an employee level, this integration should be seen in the day to day tasks, hand-offs and access to information. The number of applications installed is not the same as the number of apps integrated. Several independent systems can cause re-entry, delay and error. It is therefore about how technology is used in work, not specific brands or investments.

The second is data-driven decision support. The organizational value of the performance data created by digital systems is dependent on its quality, accessibility and use. Data, technology and organizational capabilities are found to be complementary resources in the big data analytics research literature (Mikalef et al., 2020). Employees at various levels can give reasonable reports on the currentness of information, its use in decision making and whether digital tools help identify operational issues. They are not required to reveal commercially sensitive indicators or to guarantee that they know the corporate analytics structure.

The third is employee digital enablement and change support. Digital transformation alters tasks, roles, coordination and skills needed. Digital transformation is a dynamic capability building process (Warner and Wäger, 2019) and digital leadership and strategy is linked to organizational agility (AlNuaimi et al., 2022). An employee-accessible measure, therefore, should assess the training provided, the availability of assistance and the feedback received from the employees when implementing the measure. These are not “soft” issues. A technically capable platform that cannot be used reliably by employees or that does not include local process knowledge cannot enhance performance.

Organizational performance is also multi-dimensional. While financial performance is significant, a public employee survey cannot reasonably ask all levels of employees to be aware of the audited financial performance or private financial targets. Perceived organizational performance is, therefore, the dependent variable in this study, which is measured by the current operational efficiency, work quality, responsiveness, cross-unit coordination, innovation/adaptation and overall performance judgement. This is not a method that states that employee perceptions replace audited accounts. It offers a defensible level of analysis to explore the relationship between visible digital capabilities and visible organizational outcomes.

Saudi Arabia is an appropriate context as it has seen digital services, cloud adoption, data use, automation and digitally-enabled operating models promoted through public policy and private investment across sectors. Companies, however, vary in size, industry, legacy systems, skills and maturity of implementation. A study of the chief executives or technology directors would provide a strategic perspective but would fail to capture the people who are

entering data, running systems, coordinating hand-offs and dealing with process changes. Broad rank inclusion is thus a substantive design decision. It makes it easier to access and checks if the digital transformation is lived in the daily work, and eligibility questions filter out those without relevant exposure.

1.2 Problem Statement

Digital initiatives are often defined as technology deployments, but deployment is not transformation nor performance improvement. Systems can stay disconnected, data can be missing or not used, staff can not be properly trained, and digital processes can replicate inefficient manual procedures. These implementation gaps pose a practical issue: organizations can spend a lot of money on technology and change and not get a consistent return on the investment in terms of efficiency, quality, responsiveness or innovation.

There is also a measurement dimension of the research problem. Senior managers might be able to talk about strategy and investment returns, whereas operational staff members will be more likely to notice usability, integration into workflow, delays in information, support and actual process results. Questions in a questionnaire designed for about 100 respondents, by rank should be those that can be answered directly from the work experience. Specific revenue impacts or ROIs for digital investments or enterprise-level maturity scores would lead to speculation and lack of information. The current study, however, assesses three digital competencies that are observable by employees and a multidimensional perceived-performance outcome.

Current studies on digital transformation are conceptually dense but quite diverse. There are differences in the definitions, analysis and outcomes measures (Vial, 2019; Hanelt et al., 2021; Verhoef et al., 2021). Some studies are on strategy, dynamic capabilities, analytics, business models, innovation or technology adoption. The present study is designed to fill this gap by testing an integrated employee-perception model in Saudi companies, digital process integration, data-driven decision support and employee digital enablement/change support as simultaneous predictors of perceived organizational performance. It is important to note that the model is intentionally associative, since a single non-probability survey is not able to determine the cause and effect of the variables over time.

1.3 Research Objectives

1. To investigate the link between digital process integration and the perceived organizational performance of employees in Saudi companies.
2. To investigate the relationship between data-driven decision support and perceived organizational performance of the employees of Saudi companies.
3. To investigate the relationship between employee digital enablement, change support, and perceived organizational performance of employees in Saudi companies.
4. To determine the combined predictive effect of digital process integration, data-driven decision support and employee digital enablement/change support on perceived organizational performance.
5. To determine if there is a difference between the managerial and non-managerial employees in terms of their perceived organizational performance.

1.4 Research Questions

1. How is digital process integration related to perceived organizational performance?
2. What relationship exists between data-driven decision support and perceived organizational performance?
3. How is digital enablement of employees related to change support and perceived organizational performance?

4. How well do the three digital-transformation capabilities collectively predict perceived organizational performance?

5. Is there any significant difference between the managerial and non-managerial respondents in terms of perceived organizational performance?

1.5 Research Hypotheses

H1: Digital process integration is positively associated with perceived organizational performance.

H2: Data-driven decision support is positively associated with perceived organizational performance.

H3: Employee digital enablement and change support is positively associated with perceived organizational performance.

H4: Digital process integration, data-driven decision support and employee digital enablement/change support jointly predict perceived organizational performance.

H5: Perceived organizational performance differs between managerial and non-managerial employees.

1.6 Significance of the Study

Scientific significance

The study is an application of digital-transformation theory at the employee level in a parsimonious model. It doesn't view transformation as a binary state but as a set of complementary organizational capabilities. By partitioning the process integration, decision support and employee enabling, the regression analysis can be used to assess if each dimension shows a unique statistical relationship with perceived performance once the other two are accounted for. This is a more informative score than an undifferentiated “digital transformation” score, but the cross-sectional design does not suggest that one capability caused the outcome over time.

The study also provides evidence from Saudi companies and cover managerial and non-managerial employees. The job-level comparison takes into account the perception of performance that might be experienced based on access to information and work responsibilities. Managers might be able to view strategic dashboards and aggregated indicators, while non-managerial employees might be able to see operational friction and customer facing consequences. The difference between the groups would not be proof of an objective difference; it would simply be a sign of a possible perception gap.

Practical significance

Each predictor corresponds to actions that managers can explore. Low scores on the process-integration would focus the attention on isolated systems, on duplicate entry and on poor information flow. Low decision-support scores would indicate timeliness, availability and utilization of operational data. Low enablement scores would suggest issues with training, support or employee engagement. The instrument does not require any company names or confidential financial values, so it can give diagnostic signals without unnecessary disclosure risk.

The outcome measure also helps prevent an “efficiency only” interpretation. A digital project that speeds up work but lowers quality or responsiveness will not necessarily boost organizational results. On the other hand, an ability to innovate or coordinate can generate value before it is reflected on the financial statements. The 6 item outcome offers a balanced employee view which can be used to inform further internal assessment based on objective KPIs.

1.7 Theoretical Framework and Conceptual Model

The principal framework is a synthesis of the resource-based and the dynamic-capability viewpoints. The resource-based view suggests that valuable organizational resources can contribute to performance if they are organized well, and the dynamic-capability view is focused on the ability to sense, seize, and reconfigure in dynamic environments. Digital hardware and software are readily available and are unlikely to generate any long-term value on their own. They are relevant to their performance only with complementary routines, data use, skills and change capability (Bharadwaj et al., 2013; Warner and Wäger, 2019). Digital process integration is about the operational organization of technology, data-driven decision support is about turning data into usable information, and employee enablement is about the human and change capability required to implement new processes.

The model uses perceived organizational performance (POP) as the dependent variable. Digital process integration (DPI), data-driven decision support (DDS) and employee digital enablement and change support (EDE) are the independent variables. The main regression is:

$$\text{POP} = \beta_0 + \beta_1(\text{DPI}) + \beta_2(\text{DDS}) + \beta_3(\text{EDE}) + \varepsilon.$$

The coefficients represent conditional associations. These are not causal effects, as they are based on variables measured from the same respondent at the same time. Job level is used for the planned group comparison in Objective 5. Sector is collected for description and can be coded as a control if category counts are adequate and coding is documented prior to inferential analysis.

1.8 Scope and Delimitations

The population of interest includes adults working in companies in Saudi Arabia. Eligible respondents are those who have personally used, supported or been impacted by a significant digital system, process or digital-change initiative in the last two years. The use of the reference period helps to minimize the use of the distant memory. The respondents answer questions on their current company and their own experiences that they observe in the workplace.

The study does not attempt to achieve probability-based representation of all Saudi organizations and only covers company environments where applicable, including private, public, semi-government and non-profit company settings. When the sample is obtained through professional networks or online, it is a non-probability sample. The study does not include people from the general public, people who don't work in the field of digital exposure and responses, or those who answered no to the eligibility and/or consent questions. It does not ask for a company name, system name, investment value, revenue, profit, cybersecurity incident, customer record or other confidential information.

1.9 Limitations

There are limitations in temporal inference due to the cross-sectional design. High-performing organisations can invest more effectively in digital capabilities, digital capabilities can help performance, or both can be a result of other factors like management quality. The findings should then be reported as relationships, associations and predictive patterns, not as causation.

All substantive variables are self-reported by a single respondent, which may result in common-method variance, social desirability and recall error. Procedural remedies encompass anonymity, neutral wording, a recent time frame, separate sections of the predictor and outcome, and no employer identification. Common-method bias (Podsakoff et al., 2003) cannot be ruled out by the statistical checks.

The three-item predictor scales keep the 20-question instrument concise, but they cover less content than longer validated measures. Reliability can also vary across samples. The reported alpha values support their use in this dataset, while independent replication, fuller psychometric

validation, multi-respondent organizational data and objective performance indicators remain appropriate priorities for future research.

1.10 Operational Definitions

Digital process integration (DPI): how much the digital systems support key processes, share the information that is required to complete processes, and eliminate redundant or disjointed manual processes, as reported by the employee, measured through Questions 6–8.

Data-driven decision support (DDS): the degree to which the employee reports that relevant digital information is timely, utilized in routine decision making and helpful in identifying performance issues (Questions 9–11).

Employee digital enablement and change support (EDE): employee-reported level of training, availability of practical support and consideration of employee feedback during digital implementation, measured by Questions 12–14.

Perceived organizational performance (POP): the employee's evaluation of the organization's current operational efficiency, work quality, responsiveness, coordination, innovation/adaptation and overall performance (Questions 15-20).

Managerial respondent: a supervisor/team leader, middle manager, department/project manager, senior manager or executive. All other eligible employees are considered non-managerial for the planned comparison.

1.11 Chapter Summary

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Digital transformation is a key management issue as digital technologies are now impacting the way organizations develop strategy, coordinate work, engage with customers, leverage data and design products and services. However, the expression is often used for activities of widely varying scope. Digital transformation can be defined as the installation of a cloud application, the digitalization of paper records or the redesign of an enterprise around digitally connected processes, but only the latter one would suggest a significant change in strategy and organizational structure. It is therefore inappropriate to start a literature review with the premise that all technology projects are transformation projects. It needs to define the construct, differentiate it from similar constructs and explain what sort of practices of employees can be reasonably measured in a survey. This is particularly crucial for the present study, since the respondents will not only be CIOs but also selected from various organizational levels in Saudi companies.

The review focuses on four related issues. First, it examines what the literature means by digital transformation and how it is being defined and implemented. Second, it will provide you with an understanding of why digital resources can help enhance the performance of your organization, but also why technology alone often does not. Third, it examines empirical evidence on capabilities, leadership, process integration, data use, innovation, agility and performance. Fourth, it looks at the limited Saudi evidence and constructs a model that can be tested using a cross-sectional employee survey. The substantive topic of the chapter is “impact” and the empirical claims are presented as associations, since a single questionnaire does not allow for establishing temporal precedence or eliminating all alternative explanations.

The evidence base is based on fundamental information systems research and strategy work as well as more recent digital-transformation reviews and empirical studies. It is important to have foundational studies since the current vocabulary is a re-statement of the older questions of the value of IT, strategic alignment, complementary organizational assets and dynamic capabilities. Recent reviews help to explain what is truly distinctive: ubiquity of connectivity, data-driven decision making, platform competition, and fast reconfiguration and business and technology strategy convergence. Saudi evidence is treated separately as results from China, Europe or Malaysia can be used to inform mechanisms without implying that they apply to Saudi companies. The method prevents two common pitfalls: using trendy sources without discussing their significance, and presenting a collection of positive studies as a consistent causal consensus.

2.2 Conceptual Foundations of Digital Transformation

The two Ds are interlinked and essential for digital transformation. The two Ds are intertwined and are key to digital transformation.

Verhoef et al (2021) identify three levels of escalating change. Analogue information is transformed into digital information in the process of digitization. Digitalization uses digital technologies to improve existing activities and processes. Digital transformation is also wider because it alters the organization's value proposition, capabilities, structure and performance logic. It is analytically useful to differentiate between them. The first step is digitization, the second step is automation of invoice approval, and the third step is transformation of procurement, supplier collaboration, data governance and managerial decision rights around a connected platform. The assumption that these are the same creates measurement error as a respondent may give a general answer about software use, even if the organization's strategy and operating model don't change.

Vial (2019) defines digital transformation as a process that involves digital technologies causing disruptions, leading to strategic responses, changing value creation processes and leading to structural changes and organizational barriers. This formulation is about the process and not finished. Advanced technology can be available in an organization but they might be in an early stage of transformation if incentives, routines and authority are still attached to the old model. On the other hand, a smaller company might make a significant difference with a small technology investment when it brings together customer information, decisions and workflows in a coherent way. Vial's review is influential because it relates technologies to mechanisms and outcomes, but it is not an empirical assessment of the performance effects. The role of it is to provide a specification of what a causal explanation should contain.

Gong & Ribiere (2021) developed a definition based on the input of experts and previous definitions, with the focus on fundamental change that is facilitated by the use of combinations of digital technologies and that is directed towards value creation. Their work is a reminder of the fact that transformation does not necessarily mean technical modernisation. Wessel et al. (2021) take it one step further by defining digital transformation as different from traditional IT-enabled organizational transformation. They believe digital transformation can change the organizational identity and value proposition, while traditional IT initiatives can maintain the identity and existing objectives. The difference is important in a questionnaire. Questions should focus on whether digital work and value are changing, rather than on computers or software.

Morakanyane et al. (2017) also point to digital skills, business-model transformation and significant organizational impacts as common themes in the literature. They do not have the same level of authority as a large empirical study, but they are helpful for identifying conceptual convergence in a systematic review. Nadkarni and Prügl (2021) demonstrate that there are still technologies-centred, actor-centred and institution-centred viewpoints in the field. The technical determinism of technology-centred accounts can be overstated, the managerial cognition and employee action of actor-centred accounts can be overstated, and the rules and environmental pressures of institutional accounts can be overstated. A defensible model thus considers transformation as a socio-technical organizational capability instead of an enumeration of technologies.

Recent meta-reviews support convergence and ongoing uncertainty. Hanelt et al. (2021) define digital transformation as a process of constant strategic and organizational change that is driven by digital innovation, and Reis and Melão (2023) demonstrate that reviews employ overlapping, but not identical, units of analysis, antecedents and outcomes. Plekhanov et al. (2023) similarly recognize definitional fragmentation and advocate for increased clarity in distinguishing between process, capability and outcome constructs. Kraus et al. (2022) show that management literature has grown rapidly in different disciplines, providing greater coverage but also potential for multiple constructs to be used under different names. The following reviews support the explicit construct boundaries in the present thesis: digital transformation is an independent construct, organizational performance is an outcome construct, and leadership, process integration, employee capability, and data/technology utilization are observable dimensions of the digital transformation construct.

Digital strategy and organisational scope

Matt et al. (2015) organize digital transformation strategy around the use of technologies, changes in value creation, structural changes and financial aspects. The framework is useful because it doesn't just become an IT procurement plan. A firm can introduce new applications without determining how the applications contribute to customer value, how responsibilities should shift, or how benefits will be realized and measured. The four dimensions are mutually dependent: an ambitious customer platform calls for the integration of data and new tasks; structural redesign calls for skills and funds; and technology decisions limit the potential for business models. The article is conceptual and brief, however, and needs to be operationalised empirically and not accepted uncritically.

Bharadwaj et al. (2013) believe that digital business strategy is becoming more and more blended with business and IT strategy. Digital resources shape the scope, scale and speed of business activity, and business priorities drive the architecture and data decisions. This is a melding of the previously held notion that managers develop strategy, and then an IT department “aligns” systems with that. In digitally intensive companies, product design, customer experience, analytics and operations are all technological and commercial. Digital strategy for the purposes of this study is thus evident in the priorities shared, the communication of leadership, and the integration of digital and business units, but not in a secret strategy document that lower-ranking employees might never encounter.

Verhoef et al. (2021) add that transformation occurs in stages and affects growth strategy, assets, capabilities, organizational structure and performance metrics. A business can start by digitizing the interactions with customers, then add channels and finally reconfigure the business model. This staged view helps to explain mixed performance findings. The cost and disruption of early investment can be greater than the benefits before they are realized, and not all firms are at the same stage of transformation. While cross-sectional employee perceptions cannot be used to reconstruct a complete trajectory, they can be used to evaluate whether systems are integrated, decisions are based on data, training is available, and digital initiatives enhance daily work. These indicators better reflect enacted transformation than expenditure alone.

Parviainen et al. (2017) break the strategy problem down into the following sequence: Evaluate the situation, set goals, develop a strategy map, and execute the change. In the manufacturing sector, Albukhitan (2020) uses a similar approach and stresses the importance of digital maturity assessment prior to technology selection. These frameworks can be helpful in identifying implementation practices, but they are not robust causal evidence, as they are based on cases and prescriptive models. The key in their application here is that they are used to describe how strategic intent translates into coordinated action, but not as a guarantee of superior performance if followed on a roadmap.

In three digital transformation projects, Correani et al. (2020) demonstrate the need for alignment between goals, governance, and technological architecture and organizational arrangements. Their cases demonstrate that a technically successful pilot can fail to scale because of unclear ownership, protectionism of local processes, or incentives for the old process. The small number of cases does not allow for statistical generalization, but the mechanism is plausible and is consistent with the general IT-business-value research. Digital strategy should be assessed, therefore, not just by the enthusiasm of the top management team, but by the clarity, coordination and follow-through of the strategy seen throughout the organization.

Transformation as a continuous organizational change.

According to Warner and Wäger (2019), the process of digital transformation is a continuous strategic renewal process that is driven with dynamic capabilities. Their cases highlight digital sensing, digital seizing and transforming activities, and contextual enablers like external partnerships, quick decision making and entrepreneurial attitudes. It is important that the process is ongoing. It is important to remember that a “completed” system implementation can quickly become outmoded if customer behaviour, regulations or technologies change. Transformation capability, then, is in part the organization's ability to learn and reconfigure repeatedly.

Continuous change is also a theme of Hanelt et al. (2021). Digital technology is generative: new uses arise after deployment, data grows and outside parties join platforms. This is because the result is less guaranteed than a traditional fixed-scope automation project. There is a need to balance standardization of infrastructure and experimentation at local level. Too much control stifles learning, and too much experimentation leads to cyber or data risks and to a fragmented system. So, the literature indicates that there is not a definitive best structure. The

questions in surveys should reflect the coordination and support of digital initiatives, not presume that centralization is always better.

Wessel et al. (2021) point to the concept of identity change as a key factor in understanding employee resistance. Employees might find new definitions of expertise, status and customer value if a bank becomes a platform-based service organization or a manufacturer starts selling data-enabled services. Rational concerns about job redesign or loss of professional autonomy may be a component of resistance, not just a lack of willingness to learn. Leadership and communication are important because workers understand the transformation in terms of their jobs. If capability and change support were not part of the model, then one of the main ways in which strategy becomes performance would not be included.

2.3 Organizational Performance as a Multidimensional Outcome

Defining performance

Performance of an organization is frequently taken for granted, but it can mean profitability, growth, productivity, quality, innovation, customer satisfaction, employee outcomes or mission achievement. Venkatraman and Ramanujam (1986) distinguish financial performance, broader business performance and organizational effectiveness. They caution against adding indicators from various domains together without a reason. A digital initiative can enhance service speed and information quality without impacting profit, and a public facing or regulated company can seek service and compliance results that aren't measured by sales growth.

Richard et al. (2009) discuss key measurement issues and propose that the definition of a performance construct should precede the process of choosing indicators. The researchers often employ any measures available and then call them “organizational performance”, which produces weak comparability. Objective accounting data can be useful but may not exist or may be affected by market conditions that are not related to transformation. Subjective performance measures may reflect operational and strategic gains and are subject to common method bias and optimism. The present study thus explicitly examines perceived organizational performance and does not attempt to measure audited financial performance.

DeLone and McLean (2003) offer an alternative system-success view that includes system quality, information quality, service quality, use, user satisfaction and net benefits. Their model makes clear that a system that works is not necessarily a system that is performing. System quality can increase user satisfaction without impacting strategic results, and poor adoption can be a threat to performance benefits. In this thesis, system and information quality can be considered as potential features of digital utilization, and the dependent variable should be at the organizational level and include operational efficiency, responsiveness, innovation and goal achievement.

Operational, customer, innovation and adaptive performance.

Operational performance is related to efficiency, cycle time, quality, coordination and resource utilization. Processes that are digitally integrated can eliminate duplicate data entry, increase visibility and speed up decision-making. Rai et al. (2006) demonstrate that the capability of integrating the supply chain digitally with the help of processes is linked to the performance of the firm. Their supply-chain context is more limited than the current multi-sector study, but they do confirm the principle of creating value through re-designed interdependent work, not through isolated applications.

Customer and service performance issues are related to responsiveness, consistency, personalization and experience. In Made-in-Italy SMEs, digital transformation can be a tool to help create value for the customer through dynamic capabilities, as found by Matarazzo et al. (2021). The study by Masoud and Basahel (2023) with respondents from the service sector in Saudi Arabia, shows positive relationships between digital transformation and customer experience, as well as between IT innovation and firm performance, with customer experience being a key determinant. The Saudi study is immediately relevant, but the sample is limited to managers and IT specialists and cannot be representative of all levels of organizations. It also

cannot tell if top-performing companies spend more on customer technology, if transformation drove performance, or both.

Innovation performance encompasses the rate and effectiveness of organisations in developing or enhancing products, services and processes. Khin and Ho (2019) link digital technology and digital capability to digital innovation and organizational performance in a manufacturing sample. Liu et al. (2023) examine the relationship between digital transformation and risk-taking and innovation in listed Chinese enterprises. Both studies can be used as evidence of innovation as a mechanism, but in different contexts and in different ways. There is no literature to support the idea that any use of new technology is an innovation, and meaningful innovations involve new value or new activity organization.

Agility and resilience are examples of adaptive performance. Lu and Ramamurthy (2011) differentiate between IT capability and organizational agility, and offer empirical evidence that IT capability can facilitate market sensing and operational adjustment. According to Duchek (2020), resilience is defined as anticipation, coping and adaptation. Digital tools can support each phase, with early warning information, remote coordination and quick reconfiguration, but can also introduce dependencies and cyber vulnerabilities. Therefore, performance should not just be about cost reduction, but also about responding and improving.

A measurement that is not subjective but is based on an object.

Objective indicators are appealing because they seem to be less subjective, but it is hard to make comparisons across sectors. The meaning of revenue growth varies in retail, construction, telecommunications and professional services. Capital structure, commodity prices and regulation also have an impact on accounting performance. The number of respondents in a multi-sector sample of ~100 is not likely to yield comparable audited indicators. Perceptual measures are used to assess improvements against organizational objectives and competitors; however, the wording of the measures needs to be at a level that respondents can perceive.

Lower rank respondents are defensible in the case of workflow, information access, coordination, customer responsiveness, and visible improvement questions. Don't expect them to give you precise ROI on their digital investment or profit margins that you can't see. Richard et al. (2009) endorse the explicit connection between construct and informant knowledge. The dependent scale should then read "In my organization...", and measure the relationships between digital working and processes that are faster, services that are better, innovation that is stronger, coordination that is better, and the achievement of operational goals that is better. The thesis must label the result "perceived organizational performance," retain anonymity and control for role level.

Another limitation is common-method bias, as both transformation and performance are rated by the same respondent. Procedural remedies involve separating parts of constructs, avoiding leading words in constructs, making sure there are no right answers and avoiding repeating words. Single-factor dominance can be detected by statistical checks, but common-method bias cannot be ruled out. This restriction should moderate the use of the word because in the findings chapter, the word must be used with caution.

2.4 How Digital Transformation Can Enhance Performance

Resource-based explanation

According to the resource based view, sustained advantage relies on resources that are valuable, scarce, hard to imitate and supported by the organization (Barney, 1991). Digital technologies do not typically satisfy all these conditions. Similar enterprise platforms, analytics tools or cloud services can be purchased by competing firms. Proprietary data, process knowledge that has been built up, employee skills, cross-functional routines, trusted customer relationships and governance arrangements are more likely to be differentiating resources. Therefore, there should be an unstable relationship between a simple technology-adoption variable and performance.

In information-systems research, Wade and Hulland (2004) extend resource-based reasoning to the context of information systems resources, and demonstrate that resources vary in their tradability and organizational embeddedness. External relationship management, architecture, technical skills and business partnership can add value in various ways. Melville et al. (2004) incorporate the IT resources, complementary organizational resources, business processes and environmental context into an IT-business-value model. These studies together account for the different results that the same software can produce in different companies. One company rethinks processes and decision rights; another layers the system over disjointed processes and gets very little in return.

Brynjolfsson and Hitt (2000) offer classic evidence and argument that IT returns are linked to organizational change and can be delayed. Their analysis is predating cloud platforms and AI, but the complementarity principle is still applicable. Immediate performance may drop during implementation as employees learn and data are cleaned and parallel systems are used. A cross-sectional survey can take place at various stages of this adjustment trajectory. So a weak association does not necessarily indicate that transformation is ineffective, and a strong association does not indicate the time needed to get benefits.

Dynamic-capability explanation

The dynamic-capabilities perspective emphasizes the ability to integrate, develop and reconfigure competences in response to changing environments (Teece et al., 1997). Teece (2007) structures the microfoundations in terms of sensing opportunities and threats, capturing opportunities by investing and business models, and transforming the resource base. Data is not interpreted, it can be enhanced by digital technologies, by increasing data and connectivity. Seizing involves managerial decisions, experimentation and allocation. Changes in routine, structure and skill are required for transforming.

If this is the case, then strategic renewal is an iterative process and not a single investment, as demonstrated by Warner and Wäger (2019) for digital transformation. They provide a helpful connecting thread between theory and observable practice. Staff can assess if leaders respond to digital information, if teams can experiment and if successful pilots are scaled. These actions are more of a dynamic capability than just the technology itself.

Mikalef et al. (2020) empirically differentiate between big-data analytics capability and dynamic and operational capabilities, and conclude that competitive performance is achieved via mediated paths. Wamba et al. (2017) also link analytics and performance via dynamic capabilities, and Rialti et al. (2019) provide roles for knowledge management and capability mechanisms. These studies are focused on analytics, not on digital transformation per se and most rely on cross-sectional perceptual data. Nevertheless, their convergence suggests that the direct model of technology-performance is not a complete description of the situation.

Strategic alignment and integration

Strategic alignment is consistency in business priorities, digital priorities, structures and investments. Chan et al. (1997) offer the basic proof of the need for coherent alignment between business and IS strategic orientations. In a comparison of competing explanations for alignment and agility, Tallon and Pinsonneault (2011) demonstrate that the relationship is not simply one of document matching. By aligning technology with processes where quick response is critical, agility can be achieved.

When paired with business strategy, big-data analytics capability creates better performance, according to Akter et al. (2016). The production-economics context of their production is not the same as that of Saudi multi-sector companies, but the result shows complementarity. If managers aren't using an advanced dashboard to plan, it may be useless; and if customer data is automated but service teams can't act on it, it can cause damage. Digital strategy and process integration should therefore be regarded as separate but interconnected aspects.

Bharadwaj et al. (2013) suggest that the boundary between alignment and fusion is changing. In digital business strategy, technology is not a supporting function that needs to be aligned, it is a component of the strategy. This presents a real-world example for leadership. There is no

such thing as a fully-fledged IT unit alone to take responsibility for digital responsibility. There is a need for digital understanding among business leaders and operating and customer understanding among technical leaders. Survey questions can evaluate digital initiatives against organizational goals and across departments.

The capability to integrate processes and information.

The study of Mithas et al. (2011) demonstrates that the information-management capability can affect firm performance by way of customer-management, process-management and performance-management capabilities. The source predates the recent digital-transformation buzz but clearly speaks to the question of how information is transformed into organizational value. Digital transformation should make information more accessible, consistent and usable, otherwise the data explosion can lead to more confusion.

Rai et al. (2006) show that the capabilities of digital integration of supply chains are information flows and operational processes. Their research warns against “connecting for the sake of connecting.” Integration is a change in the coordination of action across organizational boundaries that is triggered by information. In an organisation, similar integration is between sales, operations, finance, and services. Employees are in a good position to know if they re-enter data, reconcile conflicting systems or can complete tasks using connected workflows.

There are no unlimited benefits of integration. Highly coupled systems may propagate errors and reduce local flexibility. Standardization can enhance data comparability but might not adapt to specialty tasks. This literature suggests an optimization problem, rather than the idea that more integration is always better. Items should evaluate effective integration and less fragmentation, not number of connected systems.

2.5 Leadership, Culture and Employee Capability

Digital leadership and strategic direction

The challenge of digital transformation is to communicate the need for change, distribute resources, navigate interfunctional conflict and establish new decision-making processes. Cortellazzo et al. (2019) review leadership literature in a digitalized world and define the following roles: Visionary, Network, Participative, Learning and Managing Complexity. Their review is not an endorsement of any single best approach to leadership, but it does illustrate that traditional command and control assumptions might be inappropriate in contexts where expertise is spread out and experimentation is required.

AlNuaimi et al. (2022) empirically link leadership, organizational agility and digital strategy. The strength of the study is that these factors are not considered as separate variables but rather as a nexus. Indirectly, leadership can enhance performance by establishing strategic clarity and by facilitating fast coordination. The data are not Saudi and cross sectional, so the coefficients cannot be transplanted. However, the mechanisms suggest a dimension of leadership and strategy in the current model.

Leadership support is not the same as slogans. Employees can see if leaders take away obstacles, invest in training, access digital information, and foster cross-departmental collaboration and address implementation issues. A leader can talk a good talk about transformation, but still give local optimizations paper approval and reward local optimizations. This lack of consistency undermines credibility. Thus, items should measure support that is enacted and strategic clarity, not admiration of senior managers.

Digital organizational culture

The digital organizational culture is seen as a determinant of the translation of technologies into firm performance by Martínez-Caro et al. (2020). A supportive culture promotes evidence use, experimentation, collaboration and learning. However, the term “digital culture” can be a loose term that is similar to innovation climate, agility and leadership. Avoid tautological items in measurement like “our digital culture improves performance.” Rather, it should inquire about observable practices: sharing information, learning from errors, working across functions and adjusting practices.

There are tensions too in culture. Uncontrolled experimentation may lead to multiple platforms, unmanaged security and data concerns. Psychological safety can be lost if the system is standardized. Disciplined learning is therefore essential for effective transformation: teams should be able to experiment with ideas within the limits of architecture, ethics, data and risk. The balanced interpretation is in line with resource-based logic as organizational routines are valuable when they coordinate action more effectively than their competitors, and not just when they demonstrate modernity.

The skills of employees, participation and readiness

Jöhnk et al. (2021) conduct interviews to understand readiness factors for organizational AI and find strategic alignment, resources, knowledge and culture among these factors. Artificial intelligence is more limited than digital transformation, but the readiness logic can be applied. If an organization uses AI without data that can be used, without knowledge and without governance, it is not ready to capture value. The study also indicates that readiness is a multi-dimensional construct – a yes/no question about readiness would be weak.

Technical literacy, understanding of processes, confidence, access to support, opportunity to apply learning are all aspects of employee capability. Training is only counted when it is relevant and reinforced in the job. Redesigned tasks, monitoring, service channels and data-entry requirements are some of the means by which lower rank employees undergo transformation. They can provide a different point of view that can uncover gaps that executive-only samples fail to detect. For instance, leaders might say everything is working well, but frontline staff keep using spreadsheets because the official system doesn't work for them.

Wessel et al. (2021) suggest that transformation can threaten identity and participation is important. There may be resistance from employees because goals are not clear, because there is a loss of autonomy, or because there is the fear of losing their job. If you view all resistance as irrational, you will make implementation more difficult. Leaders should communicate the need and limits of change, consult users in designing change and offer convincing support. The survey is not designed to diagnose all causes, but it can help to determine if respondents believe they are receiving sufficient training, involvement and assistance.

In his discussion on higher education, Alenezi (2021) highlights readiness and the wide range of institutional change needed for digital transformation. The source is Saudi written and helpful for sensitivity but not all higher education institutions are equal to Saudi commercial companies. It should be used as a reference point on institutional transformation issues, rather than as a benchmark for the performance of the Saudi companies after digitization.

Change costs and employee consequences

Digital transformation can enhance productivity, but can also deepen the intensity of work, add surveillance, or render skills obsolete. The impact of these consequences is underestimated if only top managers respond to performance surveys. The use of respondents of different ranks expands the evidence but does not eliminate sampling bias. An employee might be able to see disruption better than a strategic benefit, and a manager might see a strategic benefit but underestimate workarounds.

The connection between employee experience and business performance is not necessarily a positive one, however. There can be a reduction in perceived performance due to short-run training time, system instability and task redesign. Benefits can be seen once routines are established. The study should gather experience and role level, which will enable the exploration of subgroup patterns with caution. About 100 responses will provide limited power for subgroup tests and should be interpreted with caution.

2.6 Data, Analytics and Technology Utilization

Technology availability to productive use

Availability of technology is a necessary, but weak indicator of transformation. Businesses can allow their ERP, CRM, analytics and collaboration applications to be licensed for enterprise use, but still make decisions using disconnected spreadsheets, personal messaging and manual

approvals. Appropriate use depends on dependable infrastructure, accessible interfaces, linked data, and access and procedures that link information to action. This is why the studies on capability tend to give a better theoretical explanation than the studies that count technologies.

Khin and Ho (2019) differentiate between digital technology and digital capability, and connect digital capability with innovation and organizational performance. From their manufacturing evidence, it is clear that having the technology and knowing how to deploy it strategically are two different constructs. Although the Malaysian context does not allow for direct inferences on Saudi firms, the difference is essential. When conducting an employee survey, don't ask a Saudi business if it has "transformed digitally" in a single question. It should question if technologies are actually used in work and if the organization can use the technologies.

Transformation, IT capabilities, and digital orientation are also explored by Barba-Sánchez et al. (2024). They are convinced that their study, published in the open access journal *Heliyon*, is in favor of a configuration view: a company with a strong focus on digital opportunities must also have the ability to turn orientation into performance. A technically competent company with no strategy can optimize the wrong processes. Reciprocal effects are possible as the study is cross-sectional, and successful firms could develop stronger capabilities. When the source is used to support the proposed association this limitation should be explicitly stated.

Digital utilization also includes reliability and interoperability. A poorly integrated or unavailable application can lead to higher waiting time and error. At this juncture, the system-success model developed by DeLone and McLean (2003) proves useful, as it provides a framework in which system quality and information quality are followed by use and satisfaction and net benefits. But the dependent variable in the model is not overall organizational performance, it's net benefit from an information system. The proposed model assumes that effective use of data and technology is a transformation dimension and that performance is measured separately.

Data quality and information management

Data-driven decision making is frequently touted as a by-product of digital transformation. In reality, the more data, the more disagreement when definitions, ownership and quality controls are weak. Mithas et al. (2011) define information-management capability as an organizational capability that assists in customer, process and performance management. Their results suggest that the value is in the control and application of information, not in storage capacity.

Jöhnk et al. (2021) list data as one of the readiness factors for AI. The end isn't just about AI as automation and analytics rely on timely, accurate and properly managed information. Data quality issues are organizational issues: Duplicates customer records can be caused by siloed ownership; missing operational data can be caused by cumbersome workflows; conflicting metrics can be caused by conflicting departmental priorities. Technology can reveal these conflicts and without governance, they cannot be resolved.

There are multiple levels of employees who can be informants for aspects of information capability. They can report on timeliness of information, trust in information used in decision making, reduction of duplication of information, and access to relevant information. They are not always able to evaluate enterprise data architecture or cybersecurity maturity. Questionnaire wording should not be beyond the experience of the respondents and should not require certification of technical controls.

The ability to analyze data and the mechanisms of performance.

There is some of the best empirical evidence in the analytics literature for capability mediated digital value. Wamba et al. (2017) connect big-data analytics capability to firm performance by dynamic capabilities. Akter et al. (2016) highlight alignment with business strategy. Mikalef et al. (2020) differentiate between dynamic capabilities and operational capabilities, and Rialti et al. (2019) model knowledge-management and capability mediators. While the sample and statistical model vary across these studies, they all reach a qualified

conclusion: analytics resources are more likely to have a positive impact on outcomes when they are integrated into organizational capabilities.

Dubey et al. (2020) further the argument to operational performance and explore entrepreneurial orientation and environmental dynamism. The results are especially relevant to manufacturing, but not necessarily to all sectors in Saudi Arabia. Rapid analytics can be more valuable during times of environmental change, but it can also be less valuable during times of environmental turbulence. This two-fold option is why it is better to test moderation claims than assume them.

There are also some drawbacks to analytics studies. Senior informants, perceptual scales and cross-sectional partial least squares models are used by many. These methods can be used with latent constructs but can overestimate relationships when the predictor and outcome is self-reported. Publication bias may be a factor in favouring significant positive models. In this regard, the sources are used to justify capability dimensions and plausible mechanisms, rather than to predict a specific regression coefficient.

Artificial intelligence and advanced technologies

Artificial intelligence, cloud computing, mobile platforms, robotic automation and connected devices can help with the transformation, but the thesis does not call for respondents to specify specific technologies. Technology is fast-changing and favors sectors where some technologies are evident. Items that are more stable and available to mixed rank respondents are capability-based items like “digital systems provide information that supports timely decisions.”

There is also a lesson to be learned from AI regarding technological determinism. Jöhnk et al. (2021) demonstrate that readiness is made up of strategy, resources, culture, knowledge and data. The advanced models can make poor decisions with biased training data and when users cannot assess output. If automation leads to errors, legal liability or loss of trust, the performance relationship could be negative. Thus, a positive hypothesis about data and technology utilization is not one that says that all advanced technology enhances performance.

2.7 Process Integration, Business Models and Customer Value

Digitally integrated processes

Process integration is the extent to which digital systems link activities, information and decisions between functions. It is not a form of automation. A department can automate an internal step, but introduce a new blocker for another department. Integration looks at the end-to-end process. Rai et al. (2006) demonstrate the relationship between digitally enabled supply-chain integration capabilities and performance, with evidence suggesting that the integration capability must be turned into a coordinated process capability.

Melville et al. (2004) situate business processes in the middle between IT resources and organizational outcomes. This structure is crucial because the financial or strategic results are too far removed to be directly linked to the software installation. When digital transformation is expected to increase performance, there are likely to be observable intermediate changes, such as: fewer hand-offs, quicker information flow, more consistent records, less rework or improved coordination. These are suitable survey indicators for employees.

Integration may also span across organizations. Supplier portals, customer applications and platform interfaces can help reduce response time and increase information sharing. However, interorganizational integration brings in dependencies, standards and data sharing risks. A company can be efficient as is, but at the same time be susceptible to a platform outage or partner failure. The literature thus indicates that effective integration should be measured, not taken for granted as being best achieved through maximum interconnection.

Business-model change

Digital transformation can alter the ways in which value is proposed, delivered and captured. Verhoef et al. (2021) relate the transformation stages to growth strategies and business models. In this article, Bouwman et al. (2019) explore the role of business-model innovation practices

in enhancing the performance of digitalizing SMEs. Their results indicate that experimentation and implementation practices are important; that a new digital channel is not enough to improve performance.

Wang et al. (2023) offer open access evidence that business-model innovation can moderate the digitalization-performance link. The national context and measurement options for the study must be recognized, but the mechanism is in line with strategy theory. Transaction costs can be lowered, personalization can be achieved or platform revenue can only be generated if the firm rethinks its activities and/or revenue logic. If the old model is maintained, technology can add cost but not value.

Li et al. (2018) offer a capability approach to the transformation process of SME entrepreneurs. Their cases show how owner-managers frequently experiment and acquire and build capabilities over time through external support. Garzoni et al. (2020) outline four different stages of SME transformation: awareness to organizational transformation. Saudi sampling considers these sources to be heterogeneous among smaller firms. Organizational size should be captured, as it can be argued that the less formal the organization is, the faster it can go, but the more limited its specialization and investment.

Priyono et al. (2020) conclude that there are several paths of business model transformation for SMEs during COVID-19. Rapid adoption is more apparent in the crisis context, and is further constrained by the crisis context. Some companies converted customer interfaces to digital, while others made a more significant change to the value proposition. The study justifies the consideration of the transformation as heterogeneous, not ranking all firms on a technology ladder.

Customer experience and responsiveness

Transformations that impact customers tend to be most visible in digital channels. They can help improve availability, personalization and response time, but they can also push work onto customers or leave out people who have less access to digital services. Integration between the front end and operational processes is critical to customer experience. A polished application isn't going to make service better if employees don't have access to the same information or can't resolve exceptions.

The study is particularly relevant to the survey of 164 representatives of Saudi service-sector firms conducted by Masoud and Basahel (2023) that shows positive relationships between digital transformation, customer experience, and IT innovation and firm performance. Their model is most sensitive to customer experience. The study offers local empirical support but a smaller number of informants than the present design, as CIOs, transformation officers and IT managers have domain expertise and may also be more positive about initiatives they are involved in. Because of its service-sector emphasis, it is not recommended to generalize to industrial, construction or resource companies.

Matarazzo et al. (2021) build on the Saudi survey with the Italian SMEs, illustrating how digital capabilities can transform customer engagement and value creation. Both sources suggest that customer responsiveness is an outcome route, but neither can be easily replicated due to the very different context. The service or customer responsiveness component of the present performance scale should be worded broadly enough to be applicable to internal-service and business-to-business firms.

Innovation and sustainable value

Digital resources can help lower experimentation cost, link external knowledge and enable new offerings. Khin and Ho (2019) place digital innovation in the middle of capability and performance. Liu et al. (2023) correlate transformation and risk-taking and innovation of Chinese listed companies. There are also strong firm-level Chinese findings of a positive relationship between transformation and performance, as seen in the work of Gao et al. (2023) and Guo and Xu (2021). These studies employ various proxies such as text disclosures and survey scales, which therefore do not necessarily converge in sign.

The findings are extended to the area of eco-innovation and sustainable performance in Chinese manufacturing by Xu et al. (2023). Feroz et al. (2021) provide a review of the relationship between digital transformation and environmental sustainability, and Martínez-Peláez et al. (2023) highlight the role of stakeholders, capabilities and technology in sustainability pathways. The following sources illustrate that environmental and stakeholder outcomes can be part of performance. If too many dimensions were added to a 20-question survey, however, the reliability would be reduced. The current study should maintain a narrow focus on organizational performance and include sustainability as an implication or higher order dependent construct.

2.8 Agility, Resilience and Environmental Conditions

The concept of organizational agility as a mechanism.

Agility: Quickly detecting and reacting to changes. Sambamurthy et al. (2003) describe how IT can enable digital options that can contribute to agility, and Lu and Ramamurthy (2011) empirically distinguish between IT capability and agility. Tallon and Pinsonneault (2011) relate strategic alignment to agility. Together, these sources suggest that agility is not synonymous with technology nor an inevitable consequence of it.

For IT capability, business-process agility and organizational performance, Chen et al. (2014) make the connection, taking environmental factors into account. The mediated structure is theoretically superior to a direct technology-performance claim. Technology can increase the options for responses, but the actions of the organization are determined by processes and authority. In very hierarchical environments, real-time data might not even speed up decision-making.

AlNuaimi et al. (2022) introduce leadership, agility and digital strategy to a modern transformation model. In their study, Troise et al. (2022) explore the concept of agility in SMEs in a volatile, uncertain, complex and ambiguous environment. Both studies confirm agility as a mechanism, but due to their cross sectional designs, directionality is left open. There may be better opportunities for transformation in more agile and successful organisations.

In the current survey, the concept of agility is combined with performance when both scales include questions regarding response time. In order to maintain discriminant validity, agility is not included as an independent mediator in the primary questionnaire. Rather, dimensions of transformation reflect enabling practices, and performance has a limited adaptability item. Agility can be discussed in the literature as a mechanism without testing a complete mediation model with a small sample.

Organizational resilience

Duchek (2020) conceptualizes resilience as anticipation, coping and adaptation. Digital systems can help them anticipate, cope, and adapt in a variety of ways: monitoring, communication, and remote work, and rapid process redesign. In the context of COVID-19, Papadopoulos et al. (2020) explain the role of digital technologies in the responses of SMEs and Guo et al. (2020) report survey evidence about the link between digitalization and crisis responses. Amankwah-Amoah et al. (2021) characterize the pandemic as a great acceleration of digitalization.

It is inappropriate to apply these crisis studies without qualification. Emergency conditions changed customer behavior, regulation and work arrangements all at the same time. Survival of the firms may be due to overrepresentation and the adoption may not have been sustainable. Yet the research reveals the attributes that are important in crisis situations: digital access, reconfigurable processes, employee skill, and external connectivity.

Digital dependence also leaves new vulnerabilities. Loss of service, cyber incident, vendor lock-in and incorrect automated decisions can diminish resilience. A well-balanced literature review should not treat digitalization as a form of resilience in itself. Resilience is based on redundancy, governance, recovery capacity, and human judgement. The positive hypotheses of the proposed survey are thus empirical propositions which can be rejected.

Firm size, sector and environmental dynamism

Eller et al. (2020) identify resources, skills, strategy and challenges in SME digitalization. Smaller companies can decide fast, but lack financial and specialist resources. Larger companies have resources, but have legacy systems, silos and slower governance. Li et al. (2018), Garzoni et al. (2020) and Melo et al. (2023) reveal that SME transformation can take unique paths. Organizational size should therefore be considered as a control or descriptive grouping, and not as proof of maturity.

Sector also matters. The processes and performance indicators of a digital service company are different from those of a construction company or manufacturing plant. Customer-facing technology is the key in services, operational technology and supply-chain integration can dominate manufacturing. The Saudi service evidence by Masoud and Basahel (2023) cannot be generalized to all sectors. A multi-sector survey is broad but is heterogeneous and needs sector controls and cautious interpretation.

The dynamism of the environment can enhance the value of sensing and agility, as shown by Dubey et al. (2020) and the literature on the concept of dynamic capabilities. It can also cause investments to be risky and data to become obsolete. Saudi companies are navigating the fast-paced policy, infrastructure and market transformation that comes with national diversification, but the thesis should not rely on policy language as a measure of firm-level performance. The empirical question is whether employees who experience more transformation practices also experience better organizational outcomes.

2.9 Evidence from SMEs and Developing-Economy Contexts

Transferability problem

Influential digital-transformation research comes from large companies and high-tech economies. Mechanisms can be general, but resource conditions, labour markets, regulation and infrastructure impact implementation. A Saudi study should be based on international research to establish a theory and test associations in the local context. It should not say that a coefficient of European SMEs or Chinese listed companies can predict Saudi organizations.

SME evidence is especially relevant since the Saudi respondents may be employed in organizations that vary widely in their degree of formalization. Bouwman et al. (2019) connect business-model innovation practices with performance in digitalisation of SMEs. Anticipating and inhibiting factors are identified by Eller et al. (2020). Rupeika-Apoga et al. (2022) demonstrate how digital orientation and capability is helping to transform during the pandemic. The studies concur that managerial intention, resources and skills are important, but they vary in the type of measures and contexts used.

Costa Melo et al. (2023) review sustainable digital transformation and SME performance and identify substantial variation in technology, performance and sustainability outcomes. Reis and Melão (2023) reach a related methodological conclusion at field level. Together, these reviews support a parsimonious model built from clearly defined capabilities rather than a complex chain of unmeasured mediators and moderators.

Crisis-driven digitalization

The COVID-19 pandemic has driven digital transformation and created a surge of studies. COVID-19 has led to digital transformation and a new wave of studies. Guo et al. (2020) link digitalization with public-crisis responses in a Chinese SME survey. Technology use by SMEs is discussed by Papadopoulos et al. (2020), while Amankwah-Amoah et al. (2021) have identified two factors: acceleration and unequal capability. Priyono et al. (2020) trace the paths of business-model transformation. These papers demonstrate the potential of digital capabilities to facilitate continuity, however they do not provide normal-period returns.

Survivor bias is also raised in the crisis literature. It was difficult to separate out the impact of technology because firms with more resources were more likely to be digitized and to survive. Outcomes were shaped by sector exposure and pre-existing maturity as well as government support. A careful review, based on the studies of the pandemics, is able to identify

the mechanisms of resilience and contextual inequalities, rather than as evidence of the fact that digital transformation always leads to better performance.

The differences in manufacturing and services.

Operational integration, analytics, automation and supply networks are among the key manufacturing studies. Dubey et al. (2020), Guo and Xu (2021), and Xu et al. (2023) examine manufacturing outcomes. Rai et al. (2006) deal with the issue of integrating the supply chain. These studies offer relevant operational mechanisms, but may underestimate outcomes related to customer-interface and knowledge-work.

Service research focuses on customer experience, channel integration and information quality. The Saudi service sector evidence is provided by Masoud and Basahel (2023), and customer value creation is described by Matarazzo et al. (2021). Based on cross-sector synthesis, process integration and employee capability and data utilization are common dimensions, but they are realized in different ways. Avoid using manufacturing or service-specific terms in the wording of questionnaires.

2.10 Digital Transformation in the Saudi Context

Relevance of the national context

Saudi organisations are in the midst of a digital infrastructure boom and a rapidly evolving regulatory landscape and economic diversification. The incentives to modernize are high, but national digital ambition doesn't necessarily equal organization capability. Firms can be small, owned, in different sectors, have different legacy technology, and have different access to skills and managerial commitment. The literature review should therefore not be based on national rankings or policy targets, but on solid evidence.

There are a number of context sensitive mechanisms proposed in the conceptual literature. Dynamic-capability theory suggests that value will increase in changing environments through sensing and reconfiguration. The differences in performance predicted by resource-based theory occur even when firms obtain similar technologies. Research on strategic-alignment indicates that transformation will fall short if digital projects are not aligned with the priorities of the organization. These mechanisms are possible in Saudi Arabia but need to be measured locally.

Direct Saudi empirical evidence

Masoud and Basahel (2023) provide directly relevant Saudi evidence from a survey of 164 representatives of service-sector companies. Their model evaluates digital transformation, customer experience, information-technology innovation and firm performance, and the reported positive relationships support the local relevance of the present research question. Their executive and specialist respondent base, however, differs from the broader employee-level perspective adopted here.

The limitations give rise to the current research gap. The respondents were chief information officers, chief transformation officers and chief IT managers. They are informants with specialist knowledge but not representative of lower ranks in the organization. They might be right on the money with strategy and investment but wrong on the ground with everyday workarounds and frontline consequences. There are many industrial and project-based organisations that are not in the sector focus. Causality cannot be inferred from cross-sectional data or from self-reported performance.

Alenezi (2021) provides a discussion on digital transformation in higher education institutions, which is helpful to understand readiness, institutional change, and skills. But the differences between higher education institutions and commercial companies in terms of governance, aims and stakeholder structure are significant. The paper will not be used as a source to support the relationship between transformation and performance in Saudi companies. It is a contextual issue: it demonstrates that transformation in the Saudi-involved institutional discourse is more than a matter of technology, and it brings up readiness issues.

Given the lack of direct evidence, the literature review should not overstate a “Saudi consensus.” Rather, it should read that one study, which is close to the service sector, indicates positive correlation, and the evidence from Saudi companies is still limited across ranks and sectors. This justifies a moderate replication-extension: test employee-observable transformation dimensions and perceived performance on the part of the respondents working in Saudi companies.

Organizational sampling

Narrowing a survey to executives can help build strategic knowledge, but can also be a barrier to access and a top management view. Lower and middle ranks enhance feasibility and represent enacted transformation. Frontline personnel see if systems incorporate tasks, if training is usable, if information quality improves, and if customer response is quicker. Middle managers monitor coordination and implementation. Senior managers monitor the outcomes of strategy and portfolio.

The design should take into account differences in knowledge. For many respondents, questions related to the value of digital investment, enterprise architecture or audited performance would be inappropriate. Questions around leadership communication, process integration, digital support, data use and perceived outcomes are more approachable. Role level should be recorded as a demographic/control variable. Mean differences can be considered, but should not be used as a definitive population difference if sample sizes allow.

Cultural and organizational factors

According to international literature, transformation conditions are leadership, hierarchy, cross-functional collaboration and learning. Cortellazzo et al. (2019) show that digital leadership involves participation and network coordination. Digital organizational culture is highlighted by Martínez-Caro et al. (2020). These constructs must be explored and not stereotyped in the Saudi context. Do not presume that all Saudi organizations are hierarchical or resistant, as company practices differ.

Language and interpretation affect survey quality because terms such as digital transformation, organizational performance and process integration can vary across roles. The supplied questionnaire and response export were in English and used concrete behavioral wording to reduce ambiguity. The study does not claim a bilingual translation or back-translation procedure. Anonymous collection also reduced direct pressure to provide socially desirable statements about employers.

2.11 Critical Synthesis of Empirical Evidence

The actual evidence for the positive is what it does establish.

Positive relationships are common in the literature that has been verified. In Saudi service firms, Masoud and Basahel (2023) conclude that positive relationships exist. Khin and Ho (2019) relate digital competence to innovation and performance. Positive relationships are found in Chinese firm data by Guo and Xu (2021), Gao et al. (2023), Wang et al. (2023), and Liu et al. (2023) with various proxies for digitalization. Barba-Sánchez et al. (2024) highlight the importance of IT skills and digital attitude. The findings of the studies of Akter et al. (2016), Wamba et al. (2017), Mikalef et al. (2020), Dubey et al. (2020), and Rialti et al. (2019) are mostly consistent with the performance benefits that occur via capability and alignment mechanisms.

This pattern is not a uniform causal estimate, but rather supports a positive research expectation. The studies have different definitions of transformation, some use managerial survey scales, some count digital keywords in reports, and others are based on analytics. It can be subjective, accounting, operational, competitive or sustainability-based. Sample includes SMEs, listed manufacturers and service-sector managers. This heterogeneity would be hidden in a narrative claim that “the literature shows that digital transformation works to improve performance”.

The best supported defensible conclusion is conditional. Organizational change that is enabled by digital is frequently linked to positive performance improvements, especially when it relates to improved process integration, customer experience, information use, innovation or agility. The relationship is explained by complementary capabilities and strategy again and again. The present study does not measure a universal return on digital investment, but it does examine if this conditional pattern is found in perceptions among Saudi company employees.

The direct and mediated effects.

Simple models assume a direct relationship between transformation and performance. These models are simple to explain but incomplete theoretically. Resource-based and dynamic-capability theories imply intermediate processes. Melville et al. (2004) lie business processes between IT resources and outcomes. Mithas et al. (2011) recognize information-management capability and associated organizational capabilities. Dynamic and operational capabilities are modeled by Mikalef et al. (2020) and related capability mechanisms are used by Wamba et al. (2017) and Rialti et al. (2019).

There are also mediated paths via customer experience and innovation. In Saudi service companies, Masoud and Basahel (2023) have included customer experience and IT innovation. The term customer value creation is explored by Matarazzo et al. (2021) and digital innovation is explored by Khin and Ho (2019). Wang et al. (2023) explore the concept of business-model innovation. This variety of mediators indicates that there are multiple pathways to transformation that impact performance.

It is not possible to test all the mediators in 20 questions and around 100 responses in the present survey. A complicated structural model would yield weak and weak estimates. Rather, the independent construct is broken down into the four components: strategy/leadership, process integration, employee capability/change support, and data/technology utilization. These dimensions are major mechanisms as observable practices. Multiple regression can estimate their unique and joint associations with perceived performance.

Contingency and heterogeneity

The relationship changes when the environment and organization change. In the IT capability–agility–performance relationship, Chen et al. (2014) take into account the environmental factors. Environmental dynamism is part of the framework of Dubey et al. (2020). In volatile conditions, Troise et al. (2022) have concentrated on SME agility. Dynamic environments can reward fast sensing and response, but can also lead to uncertainty and implementation risk.

Firm size alters the resources and coordination costs. According to Eller et al. (2020), Li et al. (2018), Garzoni et al. (2020) and Bouwman et al. (2019), SMEs have different capability and business-model challenges. Legacy systems and silos are a problem for larger organizations that have specialists and capital. In sector, the corresponding processes and outcome indicators are changed. The heterogeneity is not a nuisance to be ignored; it reduces external validity and provides justification for control variables.

Another likely contingency is digital maturity. For early-stage companies, costs and learning can occur before benefits; for mature companies, integrated platforms and routines can occur. Verhoef et al. (2021) advocate for a staged view of transformation and Parviainen et al. (2017) call for current-state assessment. Maturity is not formally modeled but rather represented indirectly by the four transformation dimensions in the present questionnaire.

The literature is found to contain methodological shortcomings. Literature is found to contain methodological weaknesses.

Much empirical research is carried out using cross-sectional surveys. They are able to make an educated guess about relationships between constructs in the latent domain but not to infer that transformation came before performance. Reverse causality can also be considered: better-performing companies can allocate more resources to digital. Both can be influenced by omitted variables like management quality, market position or organizational age. These explanations do not rule out statistical significance.

Single-informant data is also prevalent. A manager can report the organization's transformation capability and performance in a consistent positive direction. Covariance can be overstated by common scales and socially desirable beliefs. While some problems are reduced by multi-informant and archival studies, archival digital proxies can only measure disclosure and not actual practice. Studies by Chinese listed companies, such as those by Gao et al. (2023) and Liu et al. (2023), provide scale and longitudinal structure, but their textual measures are not equivalent to those experienced by employees.

The third weakness is that measurements are inconsistent. The same constructs and inconsistent terminology are reported in reviews by Vial (2019), Nadkarni and Prügl (2021), Plekhanov et al. (2023), Annarelli et al. (2021), Melo et al. (2023), and Reis and Melão (2023). Some performance scales include causes and outcomes. An item stating that “digitalization has improved our performance” embeds the hypothesized relationship and should be avoided. Independent items should describe practices, dependent items should describe outcomes.

The evidence may also be affected by publication and selection bias. Positive studies with significant results are more likely to be published and negative studies are hard to find. Companies that are involved in surveys might be more digitally involved. Visible transformation initiatives are typically chosen for case research. Thus, the literature suggests hypotheses, but not definitive conclusions. Theoretically, a null or negative result in the Saudi sample would be meaningful.

The time lag and the productivity lag. The time lag and the productivity lag.

Brynjolfsson and Hitt (2000) stress complementary organizational investment and lagged productivity impacts. Data migration, training, process redesign and temporary parallel operation are common aspects of digital programs. Short-term costs may be incurred before benefits. This timeline is condensed into cross-sectional perceptions. Two firms with similarly good programs can report the same performance, yet one firm may have a recent and unstable program.

The thesis should therefore only gather organizational experience when the respondent(s) can respond and should also include respondent tenure or project exposure. Without longitudinal data, it can't address the lag issue. A modest coefficient does not mean that a transformation is worthless in discussion; the relationship may be weak because of the timing and maturity. On the other hand, a high coefficient could be a result of well-established companies or positive common-method bias.

2.12 Integrated Theoretical Framework

The study integrates the resource-based view, dynamic capabilities theory and information-systems success reasoning. The resource-based view explains why valuable and difficult-to-replicate combinations of processes, data and employee know-how may support performance (Barney, 1991). Dynamic capabilities theory explains how organizations renew these resources through sensing, seizing and reconfiguration (Teece, 2007). Information-systems success research adds the practical requirement that digital systems provide usable information and operational value rather than technology for its own sake (DeLone & McLean, 2003).

These perspectives are expressed through three employee-observable capabilities. Digital process integration (DPI) concerns whether systems support work processes, connect information across departments and reduce fragmented or duplicated work. Data-driven decision support (DDS) concerns whether timely information informs operational decisions and helps identify problems early. Employee digital enablement and change support (EDE) concerns whether employees receive training, practical assistance and opportunities to give feedback during digital change.

The dependent variable is perceived organizational performance (POP), represented by operational efficiency, quality, responsiveness, coordination, adaptability and overall performance. This is a perceptual business-management outcome rather than an audited

financial measure. The framework therefore evaluates whether employees who report stronger digital capabilities also report stronger organizational performance.

Leadership, culture, governance and technology infrastructure remain important contextual conditions in the literature, but they are not separate predictors in the empirical model. They are discussed as mechanisms that may strengthen or weaken the three measured capabilities. This distinction keeps the theoretical narrative aligned with the questionnaire and avoids attributing an empirical test to constructs that were not measured.

The model is associative. A cross-sectional survey can identify patterned relationships and incremental predictive contributions, but it cannot demonstrate temporal sequence or definitive causation. The results are therefore interpreted as evidence about capability configurations that merit management attention, not as proof that a particular intervention will produce a predetermined financial return.

2.13 Hypothesis Development

Digital process integration and performance

Integrated processes can reduce hand-off failures, repeated data entry and local workarounds. When systems support the flow of work across functional boundaries, managers can coordinate resources with fewer delays and employees can act from a more consistent operational picture. Prior research links integrated information-technology capabilities with process performance and organizational outcomes (Melville et al., 2004; Rai et al., 2006). Accordingly, H1 proposes a positive association between DPI and POP.

Data-driven decision support and performance

Decision support creates value when reliable and timely information is connected to recurring managerial choices. Analytics capability may improve problem recognition, resource allocation and the speed of corrective action, although value depends on complementary organizational capabilities (Akter et al., 2016; Mikalef et al., 2020). Accordingly, H2 proposes a positive association between DDS and POP.

Employee digital enablement and performance

Digital change alters tasks, roles and coordination routines. Training, accessible support and employee feedback help translate technical functions into consistent use, while weak enablement can leave capable systems underused. Research on digital transformation emphasizes the organizational and human work required to embed new practices (Vial, 2019; Wessel et al., 2021). Accordingly, H3 proposes a positive association between EDE and POP.

Joint capability configuration

The three capabilities are complementary. Integrated workflows generate connected operational information; decision support converts that information into action; and employee enablement helps people use and refine the resulting routines. H4 therefore tests whether DPI, DDS and EDE jointly predict POP, while the regression coefficients indicate whether each capability contributes information beyond the other two.

Managerial and non-managerial viewpoints

Managers and non-managers may experience the same transformation differently because their responsibilities, information access and proximity to operational friction differ. A role-level comparison can reveal whether the performance narrative is shared across the hierarchy. H5 therefore tests whether mean POP differs between managerial and non-managerial employees; it does not presume the direction of the difference.

2.14 Research Gap and Contribution

The literature contains substantial evidence that digital transformation may support performance, but it also shows that outcomes depend on complementary organizational capabilities and implementation conditions. Three gaps motivate this study: limited employee-level evidence from Saudi organizations; insufficient separation of process integration, decision support and employee enablement; and limited attention to whether managerial and non-managerial employees report similar performance experiences.

This study addresses those gaps with one coherent model and one survey dataset. It evaluates the three measured capabilities individually and jointly, and it treats perceived organizational performance as a multidimensional operational outcome. The contribution is deliberately bounded: the study supplies context-specific, cross-sectional evidence useful for management diagnosis while acknowledging that longitudinal and objective performance data would be needed for stronger causal claims.

2.15 Barriers, risks and reasons for unequal outcomes

Legacy systems and process debt

Digital transformation in an organization typically starts with a few systems already in place, with local databases and undocumented processes. Legacy technology doesn't have to be dead-end, it can be used to run crucial processes without fail. The problem is that interfaces, data definition and embedded rules limit change. A replacement approach can cause operational risk and an addition approach can cause fragmentation. This tension is why there is a disconnect between apparent digital investment and poor employee experience.

Organizational debt is called process debt. When procedures are created based on previous incidents, they can include approvals that duplicate role boundaries or controls that have been changed but not aligned with customer journeys. The inefficiency can be made quicker by automation, but not necessarily better. Melville et al. (2004) focus on process change as the key to the value of IT while Parviainen et al. (2017) suggest that current-state assessment should precede roadmapping. These sources back a process-integration measure instead of an adoption count.

Legacy constraints also vary by firm-size. Some larger companies might have complex architectures and regulations, while SMEs might rely on a handful of vendors or spreadsheets. Staged and resource constrained SME transformation are described by Garzoni et al. (2020) and Eller et al. (2020), respectively. It is not to be assumed that smaller firms are less mature based on the literature. A young digital native SME might be very integrated, a large incumbent might have more technology, but less flexibility.

Inadequate governance and lack of ownership.

Transformation is across IT, operations, finance, HR, marketing and risk. If it is solely IT's responsibility, then the programme can be seen as technical and business units may not see it as their programme. Without ownership, departments can choose incompatible platforms and metrics. Matt et al. (2015) demonstrate that the transformation strategy involves structural and financial issues, while Correani et al. (2020) demonstrate the need for coherent implementation arrangements.

Governance should distribute decision making power without stifling experimentation. Standards, data ownership and cyber security controls define boundaries, and product or process teams require authority to resolve user issues. There is a proper mix for each sector and risk. The survey should consider clarity and coordination, but not prescribe a centralized or decentralized structure.

Ambiguous benefit ownership can also compromise performance. The costs of technology can be in one unit and the benefits in another, and managers can be reluctant to invest in something that will negatively impact their own budgets. Rewards may be based on transaction volume, not on customer resolution or end-to-end cycle time. Bharadwaj et al. (2013) and

Verhoef et al. (2021) suggest that digital strategy alters the nature and measures of value. Leaders need to ensure that incentives are aligned with cross-functional outcomes.

A lack of skills, workarounds and adoption quality

The use of the formal system doesn't equal effective adoption. Employees can log into a required platform and have parallel spreadsheets, notes on paper or private messaging. Workarounds may be a sign of poor training, but they may also be a sign of a real incongruity between the system and the task. If every workaround is considered noncompliance, then organizational learning will be stifled.

According to Jöhnk et al. (2021), readiness factors are knowledge and culture. Cortellazzo et al. (2019) highlight participation and learning. Wessel et al. (2021) demonstrate that identity and organizing logic can be transformed. All of these studies indicate that employee response is influenced by meaning, capability and design, and not just attitude. The employee capability/change-support dimension thus incorporates relevant preparation and access to help.

Digital skill is also not evenly spread. Don't use age or rank as a proxy. Employees can be very knowledgeable about consumer technology, but not so much about data, or very knowledgeable about process, but not so much about the new interface. Effective development is one where digital skills are linked to role and process knowledge. Items should be designed to assess if the organization allows employees to do digitally changed work, and should not be used to identify specific competencies.

The management of data, privacy and cybersecurity

Increased privacy and security exposure can be achieved with more integrated data, which can also enhance decisions. If data is not of high quality, it can automate error at scale. Too limited access = no work; too wide access = risk. The trade-offs are not secondary technical concerns as incidents can disrupt operations, erode trust and trigger regulatory costs.

DeLone and McLean (2003) focus on information and system quality in the context of net benefits. Mithas et al. (2011) describe information management as a capability. Jöhnk et al. (2021) define Data Readiness for AI. These sources warrant the question of reliable and useful information, but not necessarily of data volume.

This study did not measure cybersecurity maturity, ethics or regulatory compliance. Lower-rank respondents may not know detailed control arrangements, and the 20-item questionnaire did not include a separate risk construct. Positive capability or performance scores must therefore not be interpreted as evidence that security, ethics or compliance were audited or found satisfactory.

The need to save money and realize benefits.

Digital transformation involves investment in infrastructure, integration, data, training and change. Early budgets focus on software and underestimate complements of organizations. Why complementary investments and lags are important is explained by Brynjolfsson and Hitt (2000). Financial aspects are part of transformation strategy as per Matt et al. (2015). As long as these costs are not accounted for, benefits seem to be delayed or disappointing.

Baseline measures, ownership and follow-up are required for the benefit realization. An organization can declare implementation complete when a system is launched, but the business outcome is dependent on the adoption and process change. Without measurement of benefits, low value features persist, and successful practices are not scalable. While financial assessment is the only way to measure an employee's perception cannot be the only measure, it can be used to determine if the operational improvements that are expected are visible.

The resource constraints of SMEs are becoming more stringent. Financial and human resources are shown to be important by Eller et al. (2020) and SME performance evidence is synthesized by Melo et al. (2023). Cloud services can reduce up-front costs, but introduce ongoing fees and vendor lock-in. External support may provide expertise, but not build internal capability. The need for a context sensitive approach to company size is reinforced by these tensions.

Transformation fatigue and portfolio overload.

There are many digital projects that can be initiated within an organization at the same time. These projects may be reasonable on an individual basis but when added together, the training, data, and processes are too much for employees. When priorities shift before previous programs have taken root, transformation fatigue can diminish attention and trust. Clarity of strategy is, therefore, in part, about sequencing and stopping low value work.

Warner and Wäger (2019) speak of strategic renewal as being ongoing, but “continuous” does not necessarily imply permanent unmanaged disruption. Dynamic capability involves choosing and reconfigure, rather than just adding initiatives. Programme-level coherence is important, as demonstrated by Correani et al. (2020). Part of this issue can be captured by surveying the perceptions of clear priorities and support.

2.16 Comparative Appraisal by Research Design

The systematic review and conceptual synthesis are also included.

Vial (2019), Hanelt et al. (2021), Nadkarni and Prügl (2021), Plekhanov et al. (2023), Kraus et al. (2022), and Reis and Melão (2023) provide broad maps of the field. They have the benefit of being comprehensive in terms of technologies, theories and settings. They show recurring constructs and gaps which a single study can't. Their downside is that they rely on the quality and the vocabulary of the research they include. A review cannot make the data comparable when primary studies employ different data measures.

There are also differences in emphasis within the reviews. Vial structures disruptions, responses, changes and outcomes. Hanelt et al. are more interested in strategy and organizational change. Nadkarni and Prügl combine technology and actor perspectives. Plekhanov et al. stress definition and agenda. Reis and Melão review reviews, which identifies convergence but increases distance from primary evidence. The current system relies on their common conclusions and does not assume that any one taxonomy is the final one.

Construct clarity is supported by definition studies like Gong and Ribiere (2021) and Morakanyane et al. (2017). They do not demonstrate that transformation is a way of enhancing performance. The citation should be identical to this role. They will back up claims of meaning and boundaries, not effect size or the behaviour of Saudi companies.

Qualitative and case research

Process detail is provided in case studies. Warner and Wäger (2019) show how dynamic capabilities develop over time. The work of Correani et al. (2020) reveals implementation interactions between governance, technology and organization. The paper by Li et al. (2018) and Matarazzo et al. (2021) provides an explanation for SME capability development and customer value creation. Priyono et al. (2020) uncover diverse crisis transformation trajectories.

This evidence is strong in terms of mechanism and sequence. It can illustrate strategy to action and the reasons behind an initiative changing. The limitations are that the results are statistically generalizable and that the sample may be skewed to include interesting cases. Case findings should be used to describe survey relationships, not estimate prevalence. For instance, positive regression for process integration can be explained through case mechanisms, however, the cases do not provide evidence of the mechanism occurring in every sample Saudi company.

Cross-sectional survey research

Khin and Ho (2019), Wamba et al. (2017), Akter et al. (2016), Mikalef et al. (2020), AlNuaimi et al. (2022), Eller et al. (2020), and Masoud and Basahel (2023) use survey-based constructs. Surveys are appropriate for latent capabilities, which are not easily discernable in financial statements. They can compare respondents and estimate multivariate relationships.

The primary limitation of their use is common-method variance, informant limits and temporal ambiguity. Covariance consistent with a mechanism is what statistical mediation in cross-sectional data entails, but it does not imply that the mediator was actually a process between cause and outcome over time. Do not use words like “impact” in the present study because they are irrelevant. It should indicate that a positive coefficient confirms the hypothesized association in the sample.

There are also differences in the level of abstraction of survey scales. Senior managers can evaluate strategy, frontline staff can evaluate enacted practices. The present instrument is designed to intentionally employ observable language and multiple ranks. This enhances implementation visibility and decreases the ability for confidential performance or portfolio strategy. The trade-off is clear and suitable for access limitation.

Archival and textual-proxy studies

Gao et al. (2023), Guo and Xu (2021), and Liu et al. (2023) rely on a firm-level evidence that can offer larger samples and temporal structure. Xu et al. (2023) explores manufacturing sustainability outcomes. Archival designs minimize some of the same-source survey bias and can link transformation proxies to accounting or innovation outcomes.

But digital-transformation proxies based on the language of annual reports could reflect communication, visibility or regulatory response, not operating capability. Listed companies are not private SMEs. The results are also influenced by national industrial policy and capital-market structures. These studies support the hypothesis of economically relevant associations of digitalization, but do not automatically validate an employee perception scale.

Conclude on the strength of evidence

There is no one design to solve the research question. Constructs are clarified by reviews, mechanisms are revealed through cases, latent capabilities are measured by surveys, and scale and temporal information are provided in archival studies. A conditional positive expectation can be achieved through triangulation across designs. Meanwhile, repeated restrictions necessitate modest claims.

The present study does not provide conclusive causal evidence, but rather a small cross-sectional perspective. It is useful in the context of Saudi Arabia, its wider rank, its dimensions and its clear analysis. Results should be framed and compared with the literature and not given authority by the literature.

2.17 Implications for Questionnaire and Statistical Analysis

The literature review guided the operationalization of three predictor constructs and one outcome construct. DPI was represented by workflow support, cross-department information exchange and reduction of fragmented work. DDS was represented by timely information, routine use of information in operational decisions and early identification of problems. EDE was represented by training, practical support and employee feedback. POP covered efficiency, quality, responsiveness, coordination, adaptability and an overall performance judgment.

Each construct was measured with multiple five-point agreement items. This structure supports internal-consistency assessment and composite scores while keeping the questionnaire accessible to employees across sectors and job levels. The items were framed around observable organizational practices rather than specialist technical terminology.

The analytical design follows the conceptual model directly: descriptive statistics summarize response patterns; Cronbach's alpha assesses internal consistency; correlations describe bivariate associations; multiple regression evaluates the joint model and the unique contribution of each predictor; and a Welch independent-samples test compares managerial and non-managerial respondents. Assumption checks are reported with the results.

Content alignment was achieved by mapping each item to the construct definition and the reviewed literature. Because the study did not undertake a separate factor-analytic validation or an independent formal pilot, construct validity is interpreted cautiously and the brief scales should be validated in larger, independent samples.

2.18 Extended Cross-Source Synthesis

Capability complementarity rather than technological determinism

Across the reviewed evidence, technology is an enabling resource rather than an automatic performance cause. The resource-based view directs attention to combinations that competitors cannot easily reproduce, including process knowledge, data governance and employee expertise (Barney, 1991; Wade & Hulland, 2004). Business-value research similarly argues that information technology affects performance through organizational processes and complementary resources (Melville et al., 2004). This logic supports separate measurement of process integration, decision support and employee enablement.

Complementarity also explains why an organization may report advanced tools but modest performance gains. A technically capable platform can be constrained by fragmented workflows, unreliable information, weak decision rights or low user confidence. Conversely, strong local teams may compensate temporarily for weak systems through manual effort, masking the need for redesign. The survey captures employees' experience of these capability combinations rather than an inventory of technologies.

Integration and local adaptation

Common processes and data standards can reduce duplication and enable coordination, but excessive standardization can suppress legitimate local variation. Digitally enabled integration has been associated with process performance where information and workflows connect across organizational boundaries (Rai et al., 2006). The management question is therefore not whether everything should be identical; it is which elements need a common definition and where controlled flexibility creates value.

Employee responses can expose this balance. Repeated reconciliation, duplicate entry and inconsistent records suggest insufficient integration. Inability to handle valid exceptions may indicate excessive rigidity. Item-level analysis is useful because an average DPI score can conceal the particular workflow condition that requires attention. Process mapping and qualitative follow-up can identify whether the issue lies in system design, governance, responsibility or training.

Information quality and decision use

Decision support requires more than data availability. Information must be sufficiently current, reliable and relevant, and it must enter a decision routine with an accountable user. DeLone and McLean (2003) distinguish information and system quality from use and net benefits, while Mithas et al. (2011) connect information-management capability with firm performance. This distinction is reflected in the DDS items on timeliness, routine operational use and early problem identification.

Analytics research further shows that business value depends on organizational alignment and complementary capability (Akter et al., 2016; Mikalef et al., 2020). A high-volume dashboard environment may still perform poorly if definitions conflict or alerts do not trigger action. Accordingly, the study interprets DDS as an organizational decision capability, not as the mere presence of reporting software.

Employee enablement and enacted transformation

Digital transformation changes roles, routines and identities as well as systems. Wessel et al. (2021) distinguish transformation from conventional information-technology-enabled change by the breadth of organizational effects. Readiness studies similarly identify knowledge, resources, culture and governance as conditions for effective adoption (Jöhnk et al., 2021). Training, practical support and feedback are therefore mechanisms through which a technical design becomes enacted work.

Formal system use should not be confused with effective adoption. Employees can comply with a required platform while maintaining private spreadsheets, paper notes or informal messaging to complete the job. Such workarounds may indicate limited training, but they may also expose an impractical workflow or missing functionality. EDE therefore measures support and voice, while interpretation remains open to the organizational cause of reported difficulty.

Efficiency, responsiveness and adaptability

Organizational performance is broader than cost reduction. Strategy and measurement research distinguishes operational and financial domains and cautions against vague single indicators (Venkatraman & Ramanujam, 1986; Richard et al., 2009). The POP scale consequently includes efficiency, quality, responsiveness, coordination, adaptability and overall operational performance.

These outcomes can involve trade-offs. Standardization may improve efficiency but reduce flexibility; rapid response may increase risk if controls are bypassed; and automation can move effort from one group to another. Dynamic capability and resilience research suggests that sustainable performance requires both dependable routines and the capacity to adjust them (Teece, 2007; Duchek, 2020). Item-level results retain these distinctions even when a composite is used for hypothesis testing.

Managerial and employee viewpoints

Informant position shapes what can be observed. Senior managers are more likely to see investment portfolios, strategy and aggregate results, whereas frontline employees encounter usability, hand-offs, customer interactions and workaround burdens. Middle managers translate enterprise priorities into operational routines. A cross-level sample broadens the evidence, but it also introduces legitimate variation in perspective.

The role comparison is therefore diagnostic rather than a search for one authoritative viewpoint. Divergence may indicate differences in information access, implementation experience or expectations. Similarity may indicate broad alignment, but it can also arise from limited statistical power. Quantitative comparison should be complemented by process-specific discussion where organizations use the findings for action.

Saudi context and bounded transferability

Much of the established evidence comes from settings outside Saudi Arabia. The theoretical mechanisms may travel across contexts, but regulation, sector structure, workforce composition, digital infrastructure and management practice can affect their expression. Saudi evidence such as Masoud and Basahel (2023) provides an important local reference point, yet no single study can represent the diversity of Saudi organizations.

The current cross-sector sample adds employee-observable evidence while retaining clear limits. Non-probability recruitment does not support population estimates, and anonymous cross-sectional data do not establish organizational-level causal effects. The contribution is a coherent, locally relevant test of three capabilities that can guide further sector-specific and longitudinal work.

Alternative models and the selected design

A single digital-transformation index would be simpler, but it would blur the distinct management levers of workflow integration, decision use and employee support. A full mediation model involving agility, innovation or customer experience would be theoretically plausible, but those mediators were not measured. An objective financial design would answer a different question and would require identifiable organizations, comparable investment histories and longitudinal records.

The selected model is deliberately parsimonious. It estimates the unique and joint association of three employee-observable capabilities with multidimensional perceived performance. This design fits the available evidence and the business-management purpose of the thesis while avoiding claims about unmeasured strategy, leadership, technology intensity or financial return.

Critical position

The balance of literature supports a positive capability-dependent relationship, but not certainty. Positive findings would be consistent with international research and would extend locally relevant evidence. Null or uneven findings would not imply that digital transformation is universally ineffective; they would raise questions about implementation stage, capability complementarity, measurement and contextual transferability.

The defensible proposition is therefore narrower than a claim that digital investment causes superior performance. Organizations whose employees experience connected processes, decision-ready information and credible enablement are expected to report stronger operational performance. The empirical chapters test that proposition and interpret it within the limitations of the design.

2.19 Chapter Summary

Digital transformation is an organizational change process enabled by digital technologies, not a synonym for isolated digitization or automation. The reviewed theories explain why performance depends on valuable resource combinations, renewal capability, usable information and organizational enactment.

The literature supports three employee-observable capabilities for this study: DPI, DDS and EDE. POP is treated as a multidimensional perceptual outcome covering efficiency, quality, responsiveness, coordination, adaptability and overall operational effectiveness.

The evidence also requires restraint. Technology investment does not guarantee performance, international findings may not transfer uniformly to Saudi organizations, and cross-sectional perceptions cannot establish causality. These limitations are incorporated into the methodology and interpretation.

The chapter established five aligned hypotheses: three capability-specific associations, one joint regression model and one managerial–non-managerial comparison. Chapter 3 describes how these propositions were examined using the completed survey dataset.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the design, sample, questionnaire, data preparation and analysis used to examine the relationship between digital capabilities and perceived organizational performance. The account is written as a record of the completed study and is limited to procedures supported by the survey export and reported analysis.

3.2 Research Philosophy and Approach

The study adopted a post-positivist, deductive approach. A theoretically specified model was translated into measurable constructs and evaluated with quantitative survey evidence. This approach is appropriate for testing associations and comparing groups while recognizing that employee perceptions and cross-sectional data provide a partial representation of organizational reality (Creswell & Creswell, 2018; Saunders et al., 2019).

3.3 Research Design

A cross-sectional explanatory survey design was used. Each respondent completed the questionnaire once, producing a single time-point view of digital practices and perceived performance. The design supports estimation of associations and incremental prediction, but it does not establish temporal order or causality.

The unit of analysis was the individual employee. Responses were aggregated into multi-item construct scores only after item-level completeness and coding were checked.

3.4 Population, Eligibility and Sampling Frame

The target population comprised employed adults working in Saudi Arabia who had experience with digital tools or systems in their organization. The online questionnaire used screening questions for consent, employment in Saudi Arabia and exposure to organizational digital systems. All 100 retained respondents met these conditions.

The sample was non-probability and cross-sectoral. It included respondents from construction and related activities, banking and financial services, energy and utilities, government, information technology and telecommunications, healthcare and education, retail, and other activities. The design supports analytical insight into this sample but not population prevalence estimates.

3.5 Sample Size and Statistical Power

The achieved sample was 100 complete cases. An a priori calculation for a multiple regression with three predictors, a medium effect ($f^2 = .15$), $\alpha = .05$ and power of .80 gives a minimum near 77 cases; the achieved sample exceeds that benchmark (Cohen, 1988; Faul et al., 2009). Power calculations are planning aids rather than substitutes for representative sampling, so coefficient uncertainty and confidence intervals remain important.

3.6 Questionnaire Development

The questionnaire contained 20 fields: consent and eligibility items, role and sector descriptors, and 15 substantive five-point agreement items. The substantive items were organized as DPI (Q6–Q8), DDS (Q9–Q11), EDE (Q12–Q14) and POP (Q15–Q20). Wording focused on practices employees could reasonably observe.

Response options ranged from Strongly disagree to Strongly agree. The outcome items deliberately covered several dimensions of organizational performance rather than relying on a single global item.

3.7 Instrument Review and Administration Preparation

Before analysis, the questionnaire structure, item wording, response routing and construct mapping were checked for internal coherence. No separate pilot dataset or formal independent validation study formed part of the supplied evidence. For that reason, reliability is reported, but claims of full psychometric validation are not made.

3.8 Data Collection Procedure

Responses were collected through an online questionnaire and exported to an Excel workbook. The supplied file contained 100 response rows and 20 columns. All retained rows recorded consent, current employment in Saudi Arabia and experience with organizational digital tools or systems.

3.9 Ethical Considerations

Participation was voluntary and preceded by a consent item. The analytical file contained no direct personal identifiers, and results are presented in aggregate. The thesis does not claim an institutional approval or procedure that is not documented in the supplied study materials.

3.10 Variables and Scoring

Agreement responses were coded from 1 (Strongly disagree) to 5 (Strongly agree). Composite scores were the arithmetic means of their constituent items: DPI = mean(Q6,Q7,Q8); DDS = mean(Q9,Q10,Q11); EDE = mean(Q12,Q13,Q14); and POP = mean(Q15–Q20). Higher values indicate stronger reported capability or performance.

For the role comparison, Supervisor/Team Leader, Middle Manager and Senior Manager/Executive responses were grouped as managerial ($n = 66$), while Non-managerial/Individual Contributor responses formed the non-managerial group ($n = 31$). Three Prefer not to say responses were excluded from this specific comparison but retained in all analyses not requiring role classification.

3.11 Data Screening and Quality Assurance

The workbook was checked for row count, field completeness, eligibility responses, allowable response categories and numeric coding. All 100 retained cases had complete responses for Q6–Q20, so no imputation or case deletion was required for the construct and regression analyses. Composite ranges were also checked against the permissible 1–5 scale.

3.12 Reliability and Measurement Scope

Cronbach's alpha assessed internal consistency for each multi-item construct. The values were .800 for DPI, .888 for DDS, .835 for EDE and .913 for POP. These values meet conventional internal-consistency expectations and support composite scoring in this sample (Nunnally & Bernstein, 1994). They do not by themselves establish unidimensionality, measurement invariance or external validity.

3.13 Statistical Analysis

The Excel export was imported for analysis. Item frequencies, percentages, means and standard deviations described the response patterns. Pearson correlations summarized bivariate relationships. Ordinary least squares regression estimated POP from DPI, DDS and EDE. Standardized coefficients were calculated to compare relative contributions on a common scale.

Welch's independent-samples t test compared managerial and non-managerial POP because it does not require equal group variances. Hedges' g summarized the standardized difference. All tests were two-sided with $\alpha = .05$, and effect estimates were interpreted with confidence intervals and practical context.

3.14 Regression Assumptions and Robustness

Diagnostics covered residual normality, heteroskedasticity, multicollinearity, independence and influential observations. The Shapiro–Wilk test, Breusch–Pagan test, variance inflation factors, Durbin–Watson statistic, leverage and Cook's distance were examined. These checks inform the credibility of the fitted model but do not remove the limitations of cross-sectional self-report data.

3.15 Decision Rules and Reporting

A hypothesis was statistically supported when the relevant two-sided p value was below .05 and the estimated direction matched the stated hypothesis where directional. Statistical significance was not treated as managerial importance. Coefficients, confidence intervals, explained variance and standardized effects were considered together.

3.16 Chapter Summary

The completed study used a 100-case cross-sectional employee survey, four reliable composite measures and an analysis aligned directly with five hypotheses. The next chapter reports the verified descriptive, correlational, regression and role-comparison results.

4.1 Introduction

This chapter presents the empirical findings on organizational performance from 100 complete eligible employee responses in Saudi Arabia. It follows the quantitative design stated in Chapter Three and interprets the results as cross-sectional associations rather than causal proof. Results are linked throughout to the digital-transformation and capability literature reviewed in Chapter Two.

4.2 Survey Participation and Key Response Patterns

The final dataset contained 100 eligible and complete responses. Every respondent consented, worked in Saudi Arabia and reported experience with digital tools or systems in the organization. There were no missing responses across the 15 substantive items, which means the reported construct statistics use the full sample.

Role coverage was broad: 31 respondents were non-managerial employees, 30 were supervisors or team leaders, 31 were middle managers, five were senior managers or executives, and three preferred not to state their level. The sample therefore reflects both operational and managerial viewpoints, although the small senior-executive subgroup should not be interpreted separately.

The largest sector group was construction, engineering, manufacturing or logistics (28%). Banking, finance, insurance or professional services represented 17%; energy, utilities, oil, gas or mining 16%; government or public services 11%; and information technology, telecommunications or digital services 11%. Healthcare or education contributed 8%, retail, hospitality or other consumer services 4%, other sectors 4%, and one respondent preferred not to state a sector.

Because the sample was cross-sectoral and non-probability, these percentages describe the respondents rather than the Saudi workforce. Their value lies in showing that the findings were not generated by a single department or industry. At the same time, sector-specific conclusions would require larger samples within each sector.

4.3 Reliability and Overall Response Patterns

Cronbach alpha was calculated for each multi-item construct. All values met acceptable internal-consistency expectations, supporting the construction of the planned composite scores. Mean values were above the scale midpoint, indicating moderately positive rather than extreme assessments.

Construct	Items	Alpha	Mean	SD
DPI	3	0.800	3.53	0.85
DDS	3	0.888	3.67	0.99
EDE	3	0.835	3.57	0.93
POP	6	0.913	3.72	0.87

Table 4.1. Reliability and descriptive statistics for the study constructs.

Composite means were 3.53 for DPI (SD = 0.85, 95% CI [3.37, 3.70]), 3.67 for DDS (SD = 0.99, 95% CI [3.48, 3.87]), 3.57 for EDE (SD = 0.93, 95% CI [3.38, 3.75]) and 3.72 for POP (SD = 0.87, 95% CI [3.55, 3.89]). These results indicate generally favorable but not uniformly strong assessments.

The three capabilities were moderately related to POP: DPI $r = .451$, DDS $r = .533$ and EDE $r = .512$; all $p < .001$. Correlations among predictors ranged from .339 to .457. The pattern supports related but non-identical capability domains and does not indicate problematic predictor redundancy.

4.4 Employee Views of Digital Capabilities and Performance

Q6: The digital systems used in my work support the main steps of the relevant business processes

Q6 had a mean of 3.54 (SD = 0.99). Agreement or strong agreement accounted for 59% of responses, 25% were neutral and 16% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns workflow coverage. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Support for a process does not mean that every hand-off is integrated. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of process integration into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, manual steps and local workarounds can absorb the expected benefit. This interpretation is consistent with Melville et al. (2004) and Rai et al. (2006), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to map priority workflows from request to completion and assign an accountable process owner. The intervention should have a named

owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q6 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q7: The digital systems used in my work exchange needed information effectively across relevant teams or departments

Q7 had a mean of 3.63 (SD = 1.00). Agreement or strong agreement accounted for 54% of responses, 33% were neutral and 13% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns cross-functional information exchange. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Information availability may differ by function, role and access permission. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of process integration into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, departmental data boundaries and inconsistent definitions can absorb the expected benefit. This interpretation is consistent with Rai et al. (2006) and Bharadwaj et al. (2013), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to agree common data definitions, hand-off rules and escalation routes across functions. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q7 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q8: Digital ways of working have reduced unnecessary duplicate entry or fragmented manual work

Q8 had a mean of 3.43 (SD = 1.02). Agreement or strong agreement accounted for 47% of responses, 36% were neutral and 17% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns elimination of duplication. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. The item received the lowest agreement in the dpi scale. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of process integration into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, parallel spreadsheets, repeated entry and disconnected approvals can absorb the expected benefit. This interpretation is consistent with Parviainen et al. (2017) and Vial (2019), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to identify duplicate entry points and redesign the underlying process before adding automation. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q8 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q9: Digital systems provide sufficiently current information for routine work decisions

Q9 had a mean of 3.63 (SD = 1.10). Agreement or strong agreement accounted for 61% of responses, 25% were neutral and 14% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns information timeliness. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Timeliness does not guarantee accuracy or relevance. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of decision support into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, reporting delays and stale operational indicators can absorb the expected benefit. This interpretation is consistent with DeLone and McLean (2003) and Mithas et al. (2011), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to define update frequencies and service expectations for decision-critical information. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q9 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q10: Employees in my work area use digital information when making operational decisions

Q10 had a mean of 3.59 (SD = 1.14). Agreement or strong agreement accounted for 54% of responses, 27% were neutral and 19% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns routine evidence use. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. The relatively large dispersion indicates uneven practice. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of decision support into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, dashboards that are reviewed but not connected to decisions can absorb the expected benefit. This interpretation is consistent with Akter et al. (2016) and Mikalef et al. (2020), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to link each key measure to an owner, threshold, decision and response time. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q10 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q11: Digital tools help my work area identify performance problems early enough to respond

Q11 had a mean of 3.80 (SD = 1.04). Agreement or strong agreement accounted for 64% of responses, 24% were neutral and 12% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns early problem detection. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Early visibility creates value only when corrective action follows. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of decision support into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, alerts without ownership or a defined response can absorb the expected benefit. This interpretation is consistent with Sambamurthy et al. (2003) and Mikalef et al. (2020), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to set risk thresholds and escalation routines for exceptions that require action. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q11 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q12: Employees receive adequate training to use important digital systems and processes

Q12 had a mean of 3.45 (SD = 1.10). Agreement or strong agreement accounted for 51% of responses, 31% were neutral and 18% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns role-relevant training. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Training quality cannot be inferred from attendance alone. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of employee enablement into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, one-time generic demonstrations that do not match actual tasks can absorb the expected benefit. This interpretation is consistent with Vial (2019) and Wessel et al. (2021), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to use scenario-based training, practice time and refreshers tailored to roles. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q12 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q13: Practical support is available when employees experience problems with digital systems or new digital processes

Q13 had a mean of 3.66 (SD = 1.05). Agreement or strong agreement accounted for 59% of responses, 29% were neutral and 12% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns accessible operational support. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Support demand can reveal process or design problems, not merely user error. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of employee enablement into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, unclear ownership and slow resolution of user problems can absorb the expected benefit. This interpretation is consistent with Eller et al. (2020) and Jöhnk et al. (2021), who emphasize

complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to publish support routes, response expectations and escalation ownership. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q13 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q14: Employee feedback is considered when digital systems or digitally enabled processes are introduced or improved

Q14 had a mean of 3.59 (SD = 1.07). Agreement or strong agreement accounted for 58% of responses, 26% were neutral and 16% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns employee voice. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Voice mechanisms are credible only when employees see follow-through. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of employee enablement into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, feedback channels with no visible response or closure can absorb the expected benefit. This interpretation is consistent with Cortellazzo et al. (2019) and Wessel et al. (2021), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment

the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to record user feedback, assign decisions and communicate what changed or why it did not. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q14 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q15: Work processes in my area are completed efficiently

Q15 had a mean of 3.70 (SD = 1.07). Agreement or strong agreement accounted for 60% of responses, 28% were neutral and 12% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns operational efficiency. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. The item measures perceived improvement rather than audited cost savings. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of organizational performance into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, local speed gains that shift work or rework elsewhere can absorb the expected benefit. This interpretation is consistent with Melville et al. (2004) and Vial (2019), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to measure end-to-end cycle time, error correction and workload transfer. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work

design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q15 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q16: My organization consistently produces work outputs or services of good quality

Q16 had a mean of 3.70 (SD = 1.06). Agreement or strong agreement accounted for 66% of responses, 21% were neutral and 13% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns quality and consistency. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Quality should be defined for the relevant customer and process. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of organizational performance into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, automated errors or inconsistent data standards can absorb the expected benefit. This interpretation is consistent with Richard et al. (2009) and Verhoef et al. (2021), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to combine quality indicators with exception review and root-cause ownership. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q16 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct

but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q17: My organization responds promptly to work requests, customers or service users

Q17 had a mean of 3.78 (SD = 1.01). Agreement or strong agreement accounted for 65% of responses, 25% were neutral and 10% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns organizational responsiveness. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Speed should not be improved at the expense of control or quality. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of organizational performance into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, faster information without delegated authority to respond can absorb the expected benefit. This interpretation is consistent with Sambamurthy et al. (2003) and Duchek (2020), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to clarify decision rights and response targets alongside digital alerts. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q17 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and

the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q18: Relevant teams or departments coordinate their work effectively

Q18 had a mean of 3.66 (SD = 1.06). Agreement or strong agreement accounted for 58% of responses, 30% were neutral and 12% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns coordination across work units. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. A shared system cannot by itself resolve organizational ambiguity. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of organizational performance into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, shared platforms combined with conflicting priorities or responsibilities can absorb the expected benefit. This interpretation is consistent with Rai et al. (2006) and Bharadwaj et al. (2013), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to define process ownership, interdependence and escalation across teams. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q18 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q19: My organization adapts effectively when work requirements or operating conditions change

Q19 had a mean of 3.66 (SD = 1.02). Agreement or strong agreement accounted for 59% of responses, 29% were neutral and 12% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns adaptability. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. Adaptability requires both flexibility and disciplined learning. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of organizational performance into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, rigid workflows and slow governance for necessary changes can absorb the expected benefit. This interpretation is consistent with Teece (2007) and Ducheck (2020), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to review change lead times and maintain controlled ways to adjust workflows. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q19 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

Q20: Overall, my organization performs effectively against its operational objectives

Q20 had a mean of 3.83 (SD = 1.06). Agreement or strong agreement accounted for 63% of responses, 27% were neutral and 10% disagreed or strongly disagreed. The distribution is generally positive, but it also preserves a meaningful minority whose experience was neutral or unfavorable.

In management terms, this item concerns overall performance. The result suggests that many respondents can see a practical contribution, yet the organization-wide experience is not uniform. The variation matters because digital transformation is implemented through routines, responsibilities and decisions, not through technology ownership alone. A global perception is informative but cannot replace objective indicators. A mean above the scale midpoint should therefore be read as qualified support rather than evidence of universal maturity.

The main value mechanism is the conversion of organizational performance into dependable day-to-day behavior. Where the capability is embedded, employees can coordinate work with less uncertainty and managers receive clearer signals about performance. Where it is weak, broad success claims that are not connected to measurable outcomes can absorb the expected benefit. This interpretation is consistent with Venkatraman and Ramanujam (1986) and Richard et al. (2009), who emphasize complementary organizational resources and practices rather than a simple technology-to-performance path.

The neutral and negative responses are diagnostically useful. They may reflect differences between business units, occupations, system access, implementation stages or the quality of local management. They should not automatically be labelled resistance. Managers can segment the response by workflow or unit, then compare reported experience with service logs, cycle times, exception volumes and qualitative employee comments. This turns a broad survey signal into a focused management question.

A proportionate management response is to use a balanced benefit register covering operations, customers, employees, risk and financial consequences. The intervention should have a named owner, a baseline, a small set of outcome measures and a review date. Employee representatives should be involved where work design is affected. This creates a learning loop in which operational evidence and user experience can be considered together, while avoiding a costly organization-wide solution before the source of variation is understood.

For the broader model, Q20 illustrates why capability scores require interpretation at item level. A composite can show the overall position, while the individual statement identifies the operational practice that management can investigate. The result contributes to the construct but does not independently prove a causal effect on performance. Its value is strongest when combined with the other items, the regression results and contextual knowledge of the organization.

A useful follow-up would be a short set of interviews or facilitated process reviews with employees who selected different response categories. Questions could ask for a recent example, the people and systems involved, the consequence for customers or colleagues, and the workaround used. Such evidence would explain why perceptions diverge without converting this thesis into a heavily statistical exercise. It would also give managers concrete language for redesign priorities.

4.5 How Digital Capabilities Relate to Organizational Performance

All three predictors were positively associated with POP at the bivariate level: DPI $r = .451$, DDS $r = .533$ and EDE $r = .512$ (all $p < .001$). The multiple regression was statistically significant, $F(3, 96) = 23.25$, $p < .001$, and explained 42.1% of the variance in POP (adjusted $R^2 = .403$). The corresponding Cohen effect-size estimate was $f^2 = .727$, indicating a substantial model-level association in this sample.

Holding the other capabilities constant, DPI was significant ($B = .243$, $SE = .088$, $\beta = .236$, $p = .007$, 95% CI [.068, .418]); DDS was significant ($B = .275$, $SE = .080$, $\beta = .312$, $p < .001$, 95% CI [.117, .434]); and EDE was significant ($B = .271$, $SE = .083$, $\beta = .290$, $p = .002$, 95% CI [.105, .437]). DDS had the largest standardized coefficient, but the estimates are close

enough that management should treat the three capabilities as complementary rather than as a simple ranking.

Diagnostics did not reveal a critical violation: predictor VIF values ranged from 1.21 to 1.36; the Durbin–Watson statistic was 2.01; the Shapiro–Wilk residual test was not significant ($W = .982$, $p = .176$); and the Breusch–Pagan test was not significant ($\chi^2 = 5.60$, $p = .133$). Maximum Cook’s distance was .111 and maximum leverage was .140. These results support the reported standard errors, while the design limitations remain.

The regression intercept was .886 ($SE = .353$, $p = .014$). The root mean squared error was .674. The model is best understood as a structured summary of employee perceptions: respondents reporting stronger process integration, decision support and employee enablement also tended to report stronger performance. It is not a causal estimate of the return on a specific technology investment.

Table 4.2 Multiple regression predicting perceived organizational performance

Predictor	B	SE	Standardized β	p	95% CI for B
DPI	0.243	0.088	0.236	0.007	[0.068, 0.418]
DDS	0.275	0.080	0.312	<0.001	[0.117, 0.434]
EDE	0.271	0.083	0.290	0.002	[0.105, 0.437]

4.6 Findings Across Employee and Managerial Levels

The managerial group reported a mean POP score of 3.81 ($SD = 0.82$, $n = 66$), compared with 3.55 ($SD = 0.99$, $n = 31$) for non-managerial employees. The observed mean difference was 0.26 points in the managerial direction.

Welch’s test indicated that the difference was not statistically significant, $t(50.02) = 1.26$, $p = .212$, 95% CI for the manager-minus-non-manager difference $[-0.15, 0.67]$. Hedges’ g was 0.29, a small standardized difference. The confidence interval includes both no difference and a moderately positive managerial difference, so the evidence is inconclusive rather than proof that the groups are identical.

Three respondents who selected Prefer not to say were excluded from this comparison only. The result suggests that management should not assume a severe perception gap, but it also supports routine checks of frontline experience. Qualitative follow-up can examine whether managers have better information access or a more portfolio-level view while non-managers encounter workflow friction more directly.

4.7 What the Findings Mean for Saudi Companies

Manage digital transformation as a capability system

The findings support a management view in which value comes from a connected system of capabilities. Process integration establishes how work and information move; decision support connects information to choices; and employee enablement helps people use, challenge and improve the new routines. Weakness in any one area can limit the return from the others. A dashboard cannot compensate for fragmented source processes, and an integrated platform cannot create value if employees lack support or decision rights.

For Saudi organizations pursuing ambitious digital agendas, the practical unit of transformation should therefore be the end-to-end operating capability rather than the technology installation. Each initiative needs a process owner, data owner, adoption owner and benefit owner. These responsibilities may sit with different people, but their measures and review cadence should be joined.

Use the weaker items as a management agenda

The lowest item mean concerned reducing duplicated or fragmented work (Q8, M = 3.43), followed by adequate training (Q12, M = 3.45). These are not isolated technical complaints. They point to process redesign and human enablement as areas where expected digital benefits may be leaking away. Managers should examine repeated entry, local spreadsheets, approval loops, unclear support routes and the fit between training and actual tasks.

The positive overall means should not obscure the neutral and negative minorities. A company-wide average can conceal a business unit with a serious integration problem or a role group that cannot use the available data. Local heat maps, interviews and process walkthroughs can identify this unevenness without requiring a large new statistical program.

Connect information to recurring decisions

DDS produced the largest standardized regression coefficient. This does not establish that analytics should receive all available investment; it suggests that employees notice performance value when timely information helps with operational decisions and early problem identification. The management challenge is to specify who acts, at what threshold, within what time and with what escalation route.

Data governance should consequently be practical. For every critical metric, management should identify the source, definition, calculation, refresh frequency, quality check, accountable owner and authorized users. Reports without a decision connection create activity but not necessarily value. Conversely, a small set of trusted indicators embedded in operational meetings can improve attention and follow-through.

Treat employee enablement as operating infrastructure

EDE remained significant after controlling for the other capabilities. Training, practical support and feedback are therefore not peripheral communication activities in this model. They are part of the operating infrastructure through which digital routines become stable. Budgeting for implementation should include practice time, role-specific learning, support capacity and post-launch refinement.

Employee feedback should be managed as evidence. A credible loop records the issue, identifies the affected workflow, assigns a decision owner and communicates the outcome. This approach distinguishes a genuine design problem from a knowledge gap and reduces the risk that repeated friction is misclassified as employee resistance.

Balance perceived and objective performance

The outcome in this study is perceived organizational performance. Employee perceptions are valuable because employees observe coordination, responsiveness and work quality, but they are not audited financial or operational records. Managers should triangulate these findings with cycle time, error rates, service levels, customer outcomes, risk incidents and financial measures relevant to each initiative.

A balanced benefit register can prevent both overclaiming and underrecognition. It should include expected operational, customer, employee, risk and financial outcomes; a baseline; an owner; and a review horizon. Perceptual surveys can then explain how the operating system is experienced, while objective measures indicate whether the expected result is visible in organizational records.

Interpret the role comparison constructively

The managerial–non-managerial difference was small and statistically inconclusive. It would be inappropriate to claim either a confirmed hierarchy gap or perfect alignment. The managerial task is to keep both viewpoints visible. Managers may see enterprise-wide progress, while frontline staff can identify exceptions, workaround burdens and customer-facing consequences that aggregate reports miss.

Regular cross-level reviews can convert these perspectives into improvement. A useful meeting begins with a specific workflow and evidence, not a general debate about whether transformation is successful. This protects psychological safety and directs attention toward decisions within managerial control.

Cross-capability diagnostic scenarios

The following scenarios translate the statistical pattern into management diagnoses. They are interpretive tools, not additional empirical findings. Their purpose is to show how the three capabilities can combine in practice and how managers can gather qualitative evidence before selecting an intervention.

Scenario 1: Integrated workflows but weak decision use

The observable pattern is that employees report connected systems and smooth hand-offs, yet operational meetings continue to rely on personal judgment or late spreadsheets. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that the organization has invested in information flow without redesigning the decisions that should use it. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include high DPI, weaker DDS, recurring requests for offline reports, and few documented actions from dashboards. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to select three recurring decisions, define their information requirements, decision owners, thresholds and response times. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to interview decision makers and analysts together, using a recent exception to trace how information moved from detection to action. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario,

management should test whether high DPI, weaker DDS, recurring requests for offline reports, and few documented actions from dashboards persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that the organization has invested in information flow without redesigning the decisions that should use it; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to select three recurring decisions, define their information requirements, decision owners, thresholds and response times in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 2: Strong analytics but fragmented processes

The observable pattern is that dashboards and analytical tools are well regarded while employees still re-enter data, reconcile records or chase approvals across departments. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that analysis is being applied above an unstable process and data foundation. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include higher DDS than DPI, disagreement on Q8, inconsistent metric definitions, and substantial manual reconciliation. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to prioritize end-to-end process mapping and master-data ownership before expanding the reporting portfolio. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to observe a case from initiation to completion and record every hand-off, duplicate entry, delay and local workaround. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether higher DDS than DPI, disagreement on Q8, inconsistent metric definitions, and substantial manual reconciliation persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that analysis is being applied above an unstable process and data foundation; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to prioritize end-to-end process mapping and master-data ownership before expanding the reporting portfolio in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 3: Capable systems but weak employee enablement

The observable pattern is that technology and process scores are positive while training, support or feedback items lag. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that formal implementation may be ahead of employees' ability to use and improve the operating model. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include lower EDE, repeated support tickets, informal peer training, low confidence in exception handling, or silent workarounds. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to replace generic launch training with role-based scenarios, accessible support and scheduled post-launch learning reviews. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to compare the experiences of confident and less-confident users and ask which tasks, permissions or concepts create the difference. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether lower EDE, repeated support tickets, informal peer training, low confidence in exception handling, or silent workarounds persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that formal implementation may be ahead of employees' ability to use and improve the operating model; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to replace generic launch training with role-based scenarios, accessible support and scheduled post-launch learning reviews in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 4: Positive managerial view and weaker frontline experience

The observable pattern is that managers describe transformation progress favorably while non-managerial employees report friction in daily work. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local

failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that portfolio-level benefits and frontline costs are being viewed through different evidence. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include a role-level mean gap, conflicting examples in meetings, unresolved usability issues, or benefits measured only at aggregate level. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to create cross-level process reviews in which both performance indicators and concrete employee cases are examined. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to conduct matched interviews with a process owner, supervisor and frontline user about the same workflow rather than asking general satisfaction questions. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether a role-level mean gap, conflicting examples in meetings, unresolved usability issues, or benefits measured only at aggregate level persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that portfolio-level benefits and frontline costs are being viewed through different evidence; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association

demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to create cross-level process reviews in which both performance indicators and concrete employee cases are examined in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 5: Uneven capability across business units

The observable pattern is that the organizational average is favorable but some functions or locations depend on different systems, support arrangements or data standards. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that an average score can disguise a localized operational constraint and encourage a uniform intervention. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include wide item dispersion, clusters of neutral responses, unit-specific ticket volumes, or inconsistent cycle times. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to build a capability heat map using minimum group sizes and combine it with operational evidence before allocating improvement resources. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to select one stronger and one weaker unit for comparative process walkthroughs, focusing on practices that could be transferred responsibly.

Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether wide item dispersion, clusters of neutral responses, unit-specific ticket volumes, or inconsistent cycle times persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that an average score can disguise a localized operational constraint and encourage a uniform intervention; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to build a capability heat map using minimum group sizes and combine it with operational evidence before allocating improvement resources in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 6: Short-term disruption during implementation

The observable pattern is that employees acknowledge the intended value of a new digital process but report temporary delay, learning burden or role uncertainty. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that management may either declare failure too early or excuse persistent design problems as temporary change. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include recent go-live dates, high support demand, falling productivity followed by recovery, or repeated unresolved exceptions. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to define a stabilization period with explicit learning indicators, service thresholds, issue ownership and an exit decision. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to use weekly retrospectives to distinguish one-time learning from structural workflow defects and document whether corrective actions reduce recurrence. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether recent go-live dates, high support demand, falling productivity followed by recovery, or repeated unresolved exceptions persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that management may either declare failure too early or excuse persistent design problems as temporary change; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may

become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to define a stabilization period with explicit learning indicators, service thresholds, issue ownership and an exit decision in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 7: Positive perceptions without objective benefit evidence

The observable pattern is that survey scores are favorable but the organization has not connected them to service, customer, risk or financial measures. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that a credible employee perception is being stretched into an unsupported return-on-investment claim. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include broad success language, no baseline, benefits without owners, or performance measures selected after implementation. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to create a balanced benefit register with pre-defined outcomes, baselines, measurement frequency, owners and attribution caveats. The action

should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to ask employees for examples of changed outcomes, then test those examples against available operational records without treating either source as automatically superior. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether broad success language, no baseline, benefits without owners, or performance measures selected after implementation persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that a credible employee perception is being stretched into an unsupported return-on-investment claim; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to create a balanced benefit register with pre-defined outcomes, baselines, measurement frequency, owners and attribution caveats in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 8: Performance maintained through hidden effort

The observable pattern is that performance scores remain strong even though process integration or support is modest. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that committed employees may be compensating for weak capability through overtime, manual controls or personal networks. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include good service levels alongside high workload, spreadsheet dependence, key-person risk, or frequent after-hours correction. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to include effort, rework and resilience indicators in benefit reviews rather than measuring output alone. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to map the invisible coordination needed to deliver one successful case and identify which steps are sustainable, risky or transferable. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether good service levels alongside high workload, spreadsheet dependence, key-person risk, or frequent after-hours correction persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that committed employees may be compensating for weak capability through overtime, manual controls or personal networks; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to include effort, rework and resilience indicators in benefit reviews rather than measuring output alone in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 9: Vendor-led transformation without clear ownership

The observable pattern is that technology selection and milestones dominate governance while operating outcomes and employee responsibilities remain vague. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that delivery can be declared complete when the organization is not ready to operate or improve the capability. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include project measures focused on configuration, unresolved process decisions, unclear data ownership, or support gaps after handover. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also

consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to make operational acceptance dependent on process, data, people, control and benefit criteria as well as technical completion. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to review the handover with business owners and users, asking who will decide changes, monitor value, handle exceptions and maintain knowledge. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether project measures focused on configuration, unresolved process decisions, unclear data ownership, or support gaps after handover persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that delivery can be declared complete when the organization is not ready to operate or improve the capability; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to make operational acceptance dependent on process, data, people, control and benefit criteria as well as technical completion in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without

unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

Scenario 10: Successful pilot that does not scale

The observable pattern is that a digital practice works in one team but performs differently when extended across functions, volumes or regulatory conditions. This configuration matters because digital value is produced through a sequence of work, information, decisions and employee action. When one link is weaker, a positive organization-wide average may coexist with local failure demand or hidden effort. Managers should treat the pattern as a hypothesis to investigate, not as a diagnosis established by a single score.

The central management risk is that local success depends on people, data or authority that are not available elsewhere. A narrow response can make the imbalance worse: purchasing another tool may add complexity, while a general communication campaign may not resolve a process or data problem. The RBV and dynamic-capability perspectives imply that resources create advantage through combination, deployment and renewal; the response should therefore address the operating system around the technology.

Relevant warning signs include strong pilot testimonials, weak documentation, high reliance on champions, or declining performance as volume grows. No one sign is decisive. A useful review combines the survey distribution with process records, support demand, service measures, risk events and employee examples. Management should also consider implementation stage and local context so that a temporary transition effect is not confused with a permanent capability gap.

A focused response would be to conduct a scale-readiness review covering process variation, data quality, support capacity, controls, integration and local decision rights. The action should begin with a bounded workflow or decision, an accountable sponsor and a small number of measures. This makes it possible to learn before scaling. It also protects the organization from symbolic transformation activity in which meetings and reports expand without a corresponding change in operating behavior.

The recommended qualitative follow-up is to compare the original site with the next implementation site and record which enabling conditions must be replicated, adapted or replaced. Participants should be asked to describe a recent case, the sequence of actions, the information used, the people involved, the workaround and the consequence. Concrete episodes are more useful than general opinions because they reveal mechanisms and points of managerial control.

Alternative explanations should remain visible. The pattern may reflect sector requirements, implementation timing, access permissions, respondent expectations or the composition of the local team rather than a stable organization-wide weakness. In the present scenario, management should test whether strong pilot testimonials, weak documentation, high reliance on champions, or declining performance as volume grows persist across relevant periods and units. Recording a competing explanation before intervention reduces confirmation bias and makes the eventual decision easier to defend.

Measurement should be proportionate to the decision. For this scenario, a practical evidence set would combine one outcome measure, one process measure, one employee-experience indicator and one risk or control indicator. The measures should illuminate the concern that local success depends on people, data or authority that are not available elsewhere; they should not be selected merely because they are easy to obtain. Definitions, baselines and owners need to be agreed before a change is credited with improvement.

Leadership behavior influences whether the diagnostic process produces learning. Leaders should invite specific counterexamples, avoid punishing the disclosure of workarounds and distinguish accountability from blame. They also need to close the loop by stating what will change, what will not change and why. Without visible response, future survey scores may become less reliable because employees conclude that reporting problems has no practical consequence.

Ethical and distributional consequences should be reviewed alongside performance. A solution may improve total cycle time while increasing monitoring, shifting effort to customers or concentrating burdens on a smaller employee group. The study did not measure these outcomes separately, so managers should not infer that a positive performance association demonstrates equitable benefit. A short impact review can identify affected groups, foreseeable burdens and suitable safeguards.

Saudi organizations may also need to interpret this scenario across different regulatory, ownership and workforce arrangements. A practice that works in one sector may require different controls, language support, service expectations or authority in another. The appropriate principle is contextual consistency: preserve the intended capability and outcome while adapting implementation details to legitimate operating conditions. This reinforces the need to test the proposal to conduct a scale-readiness review covering process variation, data quality, support capacity, controls, integration and local decision rights in the actual workflow rather than assume uniform transferability.

Success and stop criteria should be agreed in advance. Success means more than completing activities; it requires a credible improvement in the selected capability or outcome without unacceptable new burdens. Stop criteria may include control failure, unresolved employee impact, poor data quality or absence of the expected operational signal. Predetermined criteria help managers resist escalation of commitment and make it legitimate to revise or discontinue an intervention that does not work as expected.

The interpretation should end with a documented decision: maintain the current arrangement, correct a defined weakness, run a limited experiment, or gather additional evidence. Ownership, completion criteria and a review date should be explicit. In this way, qualitative inquiry complements the survey without being presented as data collected for the thesis itself.

4.8 Chapter Summary and Hypothesis Outcomes

The verified results support H1, H2 and H3: DPI, DDS and EDE each had a positive, statistically significant coefficient in the multiple regression. H4 was supported because the three-predictor model was significant and explained 42.1% of POP variance. H5 was not supported because the managerial–non-managerial mean difference was not statistically significant.

Overall, the evidence depicts digital transformation as a complementary management capability. The results are favorable, but uneven item responses and the cross-sectional design require restrained interpretation. The next chapter consolidates the conclusions, practical recommendations, limitations and future research priorities.

5.1 Chapter Overview

The chapter summarizes the empirical findings, discusses the managerial and theoretical implications, and transfers the evidence to the practice of Saudi companies. It also identifies limitations for interpretation and priorities for future research. The conclusions are directly linked to the five research objectives and the validated survey findings. The data has been gathered from the individual respondents, so the chapter does not make a causal claim that digital transformation was a cause of the reported performance outcomes.

5.2 Conclusions by Research Objective

The first objective examined whether digital process integration was related to perceived organizational performance. That's the outcome of the relationship. Digital process integration made a significant positive contribution in the simultaneous model ($B = .243$, standardized beta = $.236$, $p = .007$). Those who reported that digital systems assisted the key steps of their work, facilitated information sharing between relevant units, and minimised repetition of manual work tended to report higher levels of efficiency, quality, responsiveness, coordination and adaptability. The bottom line is that connected workflows are more important than multiple applications. Even with modern software in each department, a disjointed digital environment can create the delays and reconciliation needed for manual processes.

The second goal was related to data-driven decision support. This construct had the highest standardized coefficient in the organizational-performance model ($B = .275$, standardized beta = $.312$, $p < .001$). When digital systems provided timely information and employees relied on the information for operational decisions, and digital tools were used to identify performance issues early, respondents were more positive about organizational performance. This finding corroborates the difference between data production and data use. Dashboards, reports and analytics are only useful if their definitions are trusted, the timeliness is aligned to the decision cycle and the employees who are responsible for the information have the authority to act on it.

The third goal explored digital enablement of employees and support for change. The coefficient was also positive and significant ($B = .271$, standardized beta = $.290$, $p = .002$). There seems to be a degree of practical support and consideration of employee feedback, and adequate training, as substantial elements of digital capability. They should not be used as a secondary form of communication after a system has been bought. Staff convert system function into routine performance. If users are not aware of the workflow or cannot solve the problems they encounter, or use unofficial ways to do things, the intended digital process and the process they actually perform can differ.

The third and fourth objectives measured the three capabilities together. The model was statistically significant, $F(3, 96) = 23.25$, $p < .001$, with $R^2 = .421$ and adjusted $R^2 = .403$. Therefore, the three observed capabilities of employees accounted for 42.1% of the variance in perceived organizational performance. This is a significant amount for a cross-sectional organizational survey, but it also accounts for only 57.9% of the variation observed. The variation that remains may be explained by leadership qualities, market conditions, organizational resources, organizational structure, sector, firm size, and prior performance. The fifth objective made a comparison between broad job-level groups. The mean of the managerial group was slightly higher, but the Welch test was not significant ($p = .212$) and the confidence interval contained zero. The study does not, therefore, assert a reliable rank-based difference in overall perceptions of performance.

5.3 Implications for Saudi Companies

The bottom line is that digital transformation should be managed as an operating-model transition. The three important predictors are in a practical order: processes have to be linked together, information has to be able to pass through the processes, and employees must be capable and willing to do the redesigned work. Reduced benefit realization at any point can

occur. A company can spend money on an enterprise platform and still have hand-offs in spreadsheets, or have systems integrated but with varying definitions of the same data, or have the information correct but not teach employees how to interpret it. Transformation governance should thus consider the entire end-to-end process of workflow design, data quality, decision use and employee adoption.

Not having a significant difference between job levels is also helpful. In this sample, it indicates that the performance improvement is not just a senior management story. Evidence of the working of digital processes can be provided by non-managerial employees, as well as by managers. Saudi companies must involve operational, technical and support employees in the transformation design and review, as they see exceptions, duplicate entry, data delays and workarounds that may not be reflected in any executive progress reports. Participation does not negate the need for strategic direction, it enhances the quality of evidence of implementation available to decision makers.

5.4 Practical Recommendations

1. Map and simplify end-to-end workflows before additional automation. Each priority process should have a named owner, agreed hand-offs, common data definitions and a documented target state. Duplicate entry, manual reconciliation, and interface issues that have not been addressed should be monitored as signs of incomplete integration.

2. Set up responsible data ownership. The company should outline the source, the calculation, how often the measure will be updated, the quality checks, and the responsible owner for each operational measure that is recorded in their digital report. Decision forums need to differentiate between lack of or inaccurate data and actual performance decline.

3. Relate analytics to ongoing management decisions. Dashboards should identify thresholds, responsible decision makers, escalation routes and expected response times. Reports that are reviewed without an action rule can improve visibility but not performance.

4. Consider training and support as an ongoing operational capability. Realistic tasks, realistic exercises and post-implementation refreshers should be used in role based training. Recurring user problems should be documented in support channels to enhance process design, documentation and system configuration.

5. Create structured employee-feedback mechanisms. Short user reviews, meetings with process owners and change retrospectives should document where digital workflows add delay, ambiguity or workaround behaviour. Feedback should be recorded, prioritized and actioned with a clear response.

6. Assess process level benefits of measure transformation. Baselines and targets should focus on cycle time, rework, quality, responsiveness, coordination and adoption, not on implementation milestones or system availability. After stabilization, benefits should be evaluated as the longer-term value may not be apparent in the short-term.

Implementation Roadmap

5.4.1 Establish a capability baseline

The purpose of this stage is to translate the survey signals into a small number of verified operating questions. The core work is to select priority workflows, define their customers and outcomes, document current systems and ownership, and identify available baseline measures. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

The sponsor should approve the scope and the limits of the evidence. Baselines should distinguish perception, operational record and financial estimate so that the organization does not create false precision.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.2 Prioritize by value and friction

The purpose of this stage is to focus scarce management attention where improvement is both meaningful and feasible. The core work is to combine strategic relevance with employee friction, service impact, risk exposure, implementation effort and dependency on other initiatives. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

A transparent prioritization matrix is preferable to selecting the most visible technology. The decision record should state why an item is included, deferred or rejected and what new evidence could change that choice.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.3 Redesign the process and decision together

The purpose of this stage is to avoid automating an unclear workflow or producing information without an action route. The core work is to map hand-offs, exceptions, data creation, approvals and recurring decisions; then specify ownership, thresholds, escalation and control requirements. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

Process, technology, data, risk and user representatives should review the design. The accountable business owner remains responsible for the operating outcome even when technical delivery is outsourced.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.4 Prepare employees for real tasks

The purpose of this stage is to build the knowledge and confidence required to operate the redesigned capability. The core work is to develop role-based scenarios, practice environments, job aids, support routes and manager briefings; include exceptions rather than demonstrating only the ideal path. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

Readiness should be judged through task performance and support demand, not attendance records alone. Employees need safe ways to report ambiguity and unintended consequences.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.5 Implement in a bounded setting

The purpose of this stage is to test the operating assumptions before enterprise-wide scaling. The core work is to choose a representative process area, define success and stop criteria, monitor both benefits and new burdens, and protect time for rapid correction. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

A limited operational implementation is a future management decision, not a procedure claimed for the present academic survey. Its results should be documented locally before any scaling decision.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.6 Stabilize and transfer ownership

The purpose of this stage is to move from project delivery to reliable business operation. The core work is to close critical defects, confirm support capacity, assign data and process ownership, document controls, and set the routine performance-review cadence. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

Technical completion should not be treated as operational acceptance. Handover requires named owners who have authority, resources and clear escalation routes.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.7 Evaluate balanced benefits

The purpose of this stage is to determine whether the capability improves the outcomes that justified investment. The core work is to compare agreed baselines with efficiency, quality, responsiveness, coordination, adaptability, employee, customer, risk and financial evidence as relevant. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

Evaluation should report uncertainty, competing explanations and displaced effort. Benefits should not be claimed solely because users are positive or because a project milestone was achieved.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.4.8 Learn and scale selectively

The purpose of this stage is to extend practices only when their enabling conditions are understood. The core work is to identify which process standards, data definitions, skills, support capacity, controls and leadership behaviors made the result possible, then assess their transferability. The stage should produce a concise decision record, not an expanding collection of presentation material. Each output needs an owner, an intended user and a connection to the next management decision.

Scaling decisions should preserve feedback and local adaptation within clear boundaries. A post-implementation review should record what was learned and which assumptions were not supported.

Qualitative evidence has a defined role at this stage. Short interviews, observation, process walkthroughs or retrospectives can explain why a measure changed and whose work was affected. The evidence should be recorded with the context and date, compared with available quantitative indicators, and separated from assumptions. This disciplined combination is suitable for a business-management approach because it connects organizational experience with accountable action.

A stage gate should ask whether the expected capability is visible, whether important risks are controlled, whether employees can perform the relevant tasks, and whether benefit evidence is sufficient for the next commitment. If the answer is uncertain, a bounded correction or additional evidence is preferable to automatic expansion. The roadmap therefore treats transformation as managed learning rather than a one-time installation.

5.5 Contribution to Knowledge

The study provides a model for digital transformation in the Saudi context that can be used by employees. Transformation is not a binary condition or cost of technology; instead, it is defined as three observable capacities: integrated processes, information that supports decisions, and employee enablement. The parallel importance implies a complementary-capabilities interpretation. The study also expands the informant pool beyond executive and specialist digital leaders. This is helpful because organizational performance is determined by routine execution, and routine execution is felt by all employees at all levels. The contribution is not intended to supplant studies of audited financial, customer or productivity records; it is supplemental.

5.6 Study Limitations

First, the cross-sectional design does not provide temporal order. Effective digital capabilities can also improve performance, and more successful digital capabilities can lead to more resources being available to invest in digital capabilities. Second, the predictors and outcomes were measured by the same respondents at the same time. Avoidable bias was minimized by separating the questionnaires and using neutral wording and eligibility screening, but common-method association can still occur. Third, the performance construct was perceptual and multidimensional. While it may be appropriate for respondents across organizational levels, it's not a replacement for audited profitability, productivity, service-level or customer data.

Fourthly, the sample was non-probability sample and it is not statistically representative of all Saudi companies, all sectors or employee groups in the country. The sample corroborated the intended regression, but was small enough to not be used for detailed sector-specific or seniority-specific models. Fifth, employee observations were measured, not the length of the transformation, or its level of investment or maturity. Lastly, digital transformation is not limited to the three predictors. There could be other direct or indirect impacts from cybersecurity, technology architecture, leadership, culture, business-model innovation and external competitive conditions.

5.7 Directions for Future Research

Longitudinal designs that measure capabilities before and after a specified transformation stage should be used in future studies. Multi-informant research may involve using employee surveys along with interviews and management records from the same organization. Researchers need to relate the current scales to objective measures such as processing time, error and rework rates, customer-response time, service quality, employee productivity or

financial results. Stratified samples would allow for comparisons by sector, organization size, ownership and digital maturity if larger samples were available. Structural models might include the influence of data-driven decision support or employee enablement between process integration and performance, and moderation tests might include the influence of leadership support, organizational culture and environmental dynamism.

Qualitative follow up is particularly useful in explaining why some respondents have negative or neutral composite mean scores despite their positive overall scores. Interviews and process observation may reveal that the barrier is related to system usability, data quality, unclear ownership, limited decision authority, training quality, or transformation fatigue. Time lag between disruption of implementation and resulting benefit should also be investigated. Such extensions would give a more solid foundation to causal and context-sensitive conclusions and maintain the practical employee perspective used in this study.

Qualitative follow-up design for future research

A future qualitative phase could explain why employees with similar organizational backgrounds report different capability experiences. A purposive sample could include respondents from managerial and non-managerial levels and from units with contrasting item patterns. The purpose would be explanation and theory refinement, not statistical representation.

Semi-structured interviews could be organized around recent critical incidents. Participants could describe a digital workflow that worked well or poorly, the information available, the decision made, the support received and the organizational consequence. Asking for a specific episode reduces the risk of collecting only broad opinions or rehearsed success narratives.

Process walkthroughs could complement interviews. The researcher could trace a case through systems, hand-offs, approvals and exceptions while noting duplicate entry, delays and local workarounds. This evidence would be especially valuable for interpreting Q6–Q8 because process integration is often difficult to understand from an organization-wide score alone.

Decision observations or meeting-document reviews could illuminate DDS. The focus would be whether information arrives in time, which measures are trusted, who has authority to act and what happens after an exception is identified. The analysis could distinguish information availability from actual decision use and follow-through.

Training materials, support routes and change-feedback records could help interpret EDE. These sources could show whether support is role-specific, whether recurring issues are resolved and whether employee feedback influences design. The evidence should be examined critically because formal documentation may not reflect enacted practice.

Analysis could use a transparent thematic framework based initially on DPI, DDS, EDE and POP while allowing new contextual themes to emerge. Contrasting cases and negative evidence should be retained rather than forced into the expected model. A clear audit trail of coding decisions and illustrative, anonymized excerpts would support credibility.

Ethical planning would need to protect employees who describe organizational problems. Participation should be voluntary, quotations anonymized, identifying operational details minimized and access to raw material restricted. Organizational sponsors should receive thematic findings without being able to identify individual participants.

The strongest mixed interpretation would compare qualitative mechanisms with the survey distributions and relevant operational measures. Agreement across sources would strengthen confidence; disagreement would be treated as a finding that requires explanation. This design could deepen the business-management contribution without implying that the current thesis collected interview data.

Sampling decisions could be reviewed iteratively. Initial participants might be selected from contrasting roles and sectors, followed by additional cases that test an emerging explanation. The stopping point would be based on the adequacy and diversity of evidence for the research question rather than a predetermined claim that every possible theme had been exhausted.

Researcher reflexivity would also matter. Assumptions about digital maturity, resistance or managerial competence can shape follow-up questions and coding. A reflexive record could document prior expectations, changes in interpretation and reasons for emphasizing one explanation over another. Peer review of a sample of coding could challenge overly convenient conclusions.

Case summaries could link the qualitative material to management action without exposing participants. Each summary might state the capability configuration, the observed mechanism, contextual conditions, organizational consequence and plausible intervention. Cross-case comparison could then identify recurring mechanisms and important exceptions.

Member reflection could be used carefully by presenting a concise thematic summary to participants or a diverse review group. Their task would be to identify misinterpretations, missing context and unintended disclosure risks, not to vote on whether findings are true. Differences in feedback would remain part of the analytical record.

Any future qualitative findings should be reported as a new phase with its own methods and evidence. They should not be retrospectively blended into the present survey as though interviews had already occurred. Keeping the phases distinct protects the integrity of both the current quantitative results and the richer explanations that later research may provide.

5.8 Final Conclusion

The main message is that digital transformation is organizational performance, when connected work, decision-ready information, and enabled employees come together. In the present model, all three capabilities were important and in combination accounted for a substantial proportion of the perceptions of performance. Transformation success must therefore be measured in terms of the observable operating practices, not technology deployment, of the Saudi companies. A system that is useful when it decreases fragmentation, enhances information timing and utilization, assists staff and yields quantifiable results in the way the organization operates.

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APPENDIX A: FORMAL QUANTITATIVE QUESTIONNAIRE

Participant Information

This academic study examines how employee-observable digital-transformation capabilities relate to perceived organizational performance in companies operating in Saudi Arabia. Participation is voluntary and anonymous. Do not provide your name, company name, financial figures, customer information or confidential technical details. Answer with reference to your current company and digital systems or initiatives you personally used, supported or experienced during the last two years. Estimated completion time is five to seven minutes.

Section A: Consent and Eligibility

Question 1. Do you voluntarily consent to participate in this academic survey?

- Yes, I consent and wish to continue.
- No, I do not consent.

Question 2. Are you currently employed by a company or organizational entity operating in Saudi Arabia?

- Yes.
- No.

Question 3. During the last two years, have you directly used, supported, supervised or been substantially affected by a digital system, digitally enabled process or digital-change initiative at work?

- Yes.
- No.
- Unsure.

Section B: Respondent Profile

Question 4. Which option best describes your current job level?

- Non-managerial employee or specialist.
- Supervisor or team leader.
- Middle manager, department manager or project manager.
- Senior manager or executive.
- Prefer not to say.

Question 5. Which broad sector best describes your current organization?

- Government or public services.
- Energy, utilities, oil, gas or mining.
- Construction, engineering, manufacturing or logistics.
- Banking, finance, insurance or professional services.
- Information technology, telecommunications or digital services.
- Healthcare or education.
- Retail, hospitality or other consumer services.
- Other sector.
- Prefer not to say.

Section C: Digital-Transformation Capabilities

For Questions 6–14, select one response for each statement:

- Strongly disagree.
- Disagree.

- Neither agree nor disagree.
- Agree.
- Strongly agree.

Question 6. The digital systems used in my work support the main steps of the relevant business processes.

Question 7. The digital systems used in my work exchange needed information effectively across relevant teams or departments.

Question 8. Digital ways of working have reduced unnecessary duplicate entry or fragmented manual work.

Question 9. Digital systems provide sufficiently current information for routine work decisions.

Question 10. Employees in my work area use digital information when making operational decisions.

Question 11. Digital tools help my work area identify performance problems early enough to respond.

Question 12. Employees receive adequate training to use important digital systems and processes.

Question 13. Practical support is available when employees experience problems with digital systems or new digital processes.

Question 14. Employee feedback is considered when digital systems or digitally enabled processes are introduced or improved.

Section D: Perceived Organizational Performance

For Questions 15–20, use the same five response options from strongly disagree to strongly agree. Consider your current organization's ordinary performance.

Question 15. Work processes in my area are completed efficiently.

Question 16. My organization consistently produces work outputs or services of good quality.

Question 17. My organization responds promptly to work requests, customers or service users.

Question 18. Relevant teams or departments coordinate their work effectively.

Question 19. My organization adapts effectively when work requirements or operating conditions change.

Question 20. Overall, my organization performs effectively against its operational objectives.

Appendix B: Data Preparation and Analysis Record

B.1 Source Data

The analytical source was the Excel workbook exported from the online questionnaire. The worksheet contained 100 response rows and 20 columns. All 100 rows recorded consent, current employment in Saudi Arabia, experience with organizational digital tools or systems, and complete answers to Q6–Q20.

B.2 Coding and Composite Scores

Agreement responses were coded as Strongly disagree = 1, Disagree = 2, Neither agree nor disagree = 3, Agree = 4 and Strongly agree = 5. No reverse-coded item was used.

DPI = mean(Q6, Q7, Q8); DDS = mean(Q9, Q10, Q11); EDE = mean(Q12, Q13, Q14); POP = mean(Q15, Q16, Q17, Q18, Q19, Q20). Each score therefore remained on the original 1–5 scale.

B.3 Validation Checks

Validation covered the worksheet dimensions, required eligibility responses, missing values, response categories and the permissible range of every coded item and composite. No substantive value was missing and no imputation was used. The three Prefer not to say job-level responses were retained for all full-sample analyses and excluded only from the managerial versus non-managerial comparison.

B.4 Analysis Workflow

The Excel worksheet was imported, categorical agreement responses were mapped to numeric scores, and the four composites were calculated row by row. Item distributions and construct means were then summarized. Internal consistency was estimated with Cronbach's alpha, bivariate relationships with Pearson correlations, and the multivariable relationship with ordinary least squares regression. The role comparison used Welch's independent-samples t test.

Regression diagnostics included variance inflation factors, Shapiro–Wilk residual normality, Breusch–Pagan heteroskedasticity, Durbin–Watson residual independence, leverage and Cook's distance. Standardized regression coefficients, 95% confidence intervals, Cohen's f^2 and Hedges' g were calculated to support substantive interpretation.

B.5 Reproducibility Values

Reliability and construct summaries were: DPI $\alpha = .800$, $M = 3.533$, $SD = .848$; DDS $\alpha = .888$, $M = 3.673$, $SD = .989$; EDE $\alpha = .835$, $M = 3.567$, $SD = .933$; and POP $\alpha = .913$, $M = 3.722$, $SD = .873$.

The fitted regression equation was $POP = 0.886 + 0.243(DPI) + 0.275(DDS) + 0.271(EDE)$. Model R^2 was .421 and adjusted R^2 was .403, $F(3, 96) = 23.249$, $p < .001$. These values provide checkpoints for independent reproduction from the supplied Excel data.

B.6 Hypothesis Map

H1 corresponds to the DPI coefficient; H2 to the DDS coefficient; H3 to the EDE coefficient; H4 to the overall three-predictor regression; and H5 to the Welch comparison of managerial and non-managerial POP. This mapping keeps every reported decision tied to a measured variable and a stated analysis.