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Analyzing the Mediating Role of Organizational Readiness on Industry 4.0 Capabilities and Digital Transformation Strategy

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ABSTRACT

This study examines the role of Industry 4.0 capabilities in shaping digital transformation strategy (DTS) within municipal service management, with a particular focus on the mediating role of organizational readiness. This study aims to provide fresh insights into how technological capabilities are translated into strategic transformation outcomes in the context of Omani municipalities. A quantitative research approach was adopted using a structured survey administered to 400 respondents across Omani municipalities. Stratified random sampling was used to ensure representation across departments and managerial levels. Structural equation modeling (SEM) using SmartPLS 4 was employed to test the proposed relationships and mediation effects among Industry 4.0 capabilities, organizational readiness, and DTS. The results revealed that Industry 4.0 capabilities have a significant positive impact on DTS and organizational readiness. Organizational readiness also significantly influences DTS and partially mediates the relationship between Industry 4.0 capabilities and DTS. These findings highlight the critical role of organizational preparedness in enabling the effective implementation of digital transformation strategies in municipal contexts. This study contributes to the literature by integrating the RBV, DCV, and PBV to explain the relationship between Industry 4.0 capabilities and DTS. It offers a novel perspective by identifying organizational readiness as a key mediating mechanism, providing both theoretical advancement and practical insights for policymakers and municipal managers in digitally transforming environments.

Keywords: Digital Transformation Strategy, Industry 4.0 Capabilities, Organizational Readiness, Municipal Services, Public Sector, Omani Municipalities
JEL Classification: M1

1. INTRODUCTION

In recent years, the rapid advancement of digital technologies has fundamentally reshaped how public sector organizations design, deliver, and manage services, particularly within municipal contexts. Technologies associated with the Industry 4.0 paradigm such as artificial intelligence (AI), Internet of Things (IoT), big data analytics, and cloud computing have enabled governments to enhance service efficiency, transparency, and responsiveness (Behie et al., 2023; Frank et al., 2019). As a result, municipalities are increasingly adopting digital solutions to improve urban governance, optimize resource allocation, and respond to growing citizen expectations for high-quality and accessible public services (Vinodh et al., 2021). This technological shift has positioned digital transformation strategy (DTS) as a critical priority for modern municipalities seeking to remain effective, sustainable, and citizen-centric in an increasingly complex environment.

Parallel to the rise of digital transformation, Industry 4.0 capabilities have emerged as key enablers of organizational modernization by integrating advanced technologies into operational and managerial processes (Gangaraju et al., 2025; Majeed and Rupasinghe, 2017). These capabilities facilitate real-time data integration, automation of service delivery, and enhanced interconnectivity across municipal systems, thereby enabling more adaptive and intelligent governance structures. In

municipal service management, Industry 4.0 capabilities support the transition from traditional bureaucratic systems toward more agile, data-driven, and service-oriented models (Kamble et al., 2020; Lu et al., 2024). Such transformation is particularly important in addressing contemporary urban challenges, including population growth, environmental sustainability, and infrastructure complexity.

Despite the growing importance of industry 4.0, the successful implementation of DTS in municipalities remains uneven and is often constrained by internal organizational factors. Prior studies suggest that the mere adoption of advanced technologies does not guarantee effective transformation outcomes, as organizations must possess the necessary capabilities, structures, and readiness to leverage these technologies strategically (Bari et al., 2022; Onwu et al., 2023). In this context, organizational readiness has emerged as a critical determinant of successful digital transformation, reflecting the extent to which an organization is prepared technologically, structurally, and culturally to implement and sustain digital initiatives (Jones et al., 2005). Organizational readiness encompasses key elements such as leadership commitment, employee competencies, technological infrastructure, and openness to change, all of which influence the ability of municipalities to translate Industry 4.0 capabilities into coherent and effective digital strategies (Magalhães et al., 2023).

From a theoretical perspective, the resource-based view (RBV) emphasizes that organizational performance is driven by valuable and rare resources, while the dynamic capability view (DCV) extends this perspective by highlighting the importance of an organization's ability to integrate, reconfigure, and deploy these resources in dynamic environments (Khan et al., 2024; Moderno et al., 2024). Within this framework, Industry 4.0 capabilities can be viewed as strategic resources, whereas organizational readiness represents a higher-order capability that enables municipalities to effectively mobilize these resources to develop and implement digital transformation strategies. Thus, organizational readiness plays a mediating role by bridging the gap between technological potential and strategic execution (Xie et al., 2023).

Although the literature has extensively examined digital transformation and Industry 4.0 in private sector and manufacturing contexts, limited attention has been given to public sector organizations, particularly municipalities in developing regions such as Oman. Municipal service environments are characterized by unique challenges, including bureaucratic rigidity, regulatory constraints, and diverse stakeholder demands, which complicate digital transformation efforts. Moreover, existing studies have primarily focused on direct relationships between technology adoption and performance outcomes, with insufficient exploration of the underlying mechanisms through which Industry 4.0 capabilities influence DTS. In particular, the mediating role of organizational readiness in municipal contexts remains underexplored, representing a significant gap in the literature.

To address these gaps, the present study investigates the relationship between Industry 4.0 capabilities and DTS, with a specific focus on the mediating role of organizational readiness in Omani municipalities. By adopting an integrated theoretical framework grounded in RBV and DCV, this study aims to provide a deeper understanding of how technological capabilities are translated into strategic transformation outcomes in public sector environments. Accordingly, the study seeks to answer the following research questions:

- RQ1: What is the impact of industry 4.0 capabilities on digital transformation strategy in municipalities?
- RQ2: How do Industry 4.0 capabilities influence organizational readiness?
- RQ3: What is the impact of organizational readiness on digital transformation strategy?
- RQ4: Does organizational readiness mediate the relationship between Industry 4.0 capabilities and digital transformation strategy?

To address these questions, a theoretical model is developed and empirically tested using data collected from Omani municipalities. Structural equation modeling (SEM) is employed to examine the proposed relationships. The findings of this study are expected to contribute to both theory and practice by providing new insights into the role of organizational readiness in facilitating digital transformation within public sector organizations.

The remainder of this paper is structured as follows. Section 2 presents the theoretical background and hypothesis development. Section 3 outlines the research methodology. Section 4 reports the empirical findings. Section 5 discusses the results and their implications. Finally, Section 6 concludes the study and suggests directions for future research.

2. THEORETICAL UNDERPINNING

(Taleb and Pheniqi, 2023) (Mushtaha and Alsmairat, 2023). In contemporary digital environments, organizations increasingly rely on strategic resources and capabilities to respond to technological disruptions and dynamic market conditions (Alsmairat, 2023). Accordingly, this study draws on the RBV and extends it through the DCV to explain how Industry 4.0 capabilities drive DTS. RBV posits that competitive advantage stems from valuable and rare resources, while DCV emphasizes the ability to integrate, reconfigure, and deploy these resources in rapidly changing environments (Teece, 2007). In this context, Industry 4.0 technologies such as AI, big data, and cloud computing enhance organizational sensing, seizing, and transforming capabilities (Mushtaha and Alsmairat, 2023). However, the effective utilization of these technologies depends on organizational readiness, which reflects technological, human, and structural preparedness for transformation. Furthermore, this study incorporates the Practice-Based View (PBV), which suggests that organizational performance is driven by the implementation of transferable digital practices (Taleb and Pheniqi, 2023). Within municipal contexts, digital transformation represents a set of operational practices that translate Industry 4.0 capabilities into strategic outcomes. Therefore, organizational readiness acts as a critical mediating capability that bridges technological potential and strategic execution, enabling municipalities to effectively implement digital transformation strategies.

3. HYPOTHESES DEVELOPMENT

3.1. Industry 4.0 Capabilities and Digital Transformation Strategy

Although DTS has been increasingly conceptualized as a distinct construct from related concepts such as digitalization and Industry 4.0, the relationship between these constructs remains somewhat ambiguous in the literature (Schiuma et al., 2022). Prior studies indicate that the interchangeable use of these concepts often creates confusion regarding their scope, directionality, and interrelationships (Nair et al., 2024; Nureen et al., 2023). However, existing research provides important insights into how Industry 4.0 capabilities influence digital transformation at the strategic level. DTS involves profound changes in organizational processes, governance structures, and value creation mechanisms through the integration of advanced digital technologies (Yuan et al., 2024). In this regard, Industry 4.0 capabilities—encompassing technologies such as artificial intelligence, big data analytics, and cloud computing serve as key enablers of such transformation by enhancing real-time data availability, connectivity, and intelligent decision-making (Agrawal et al., 2020). These technologies facilitate the redesign of workflows, improve coordination, and support the development of data-driven strategies, thereby accelerating the transformation of traditional operational models into more agile and adaptive systems.

Moreover, Industry 4.0 capabilities extend beyond technological infrastructure to include managerial and human competencies required to effectively leverage digital technologies (Rupp et al., 2021). These capabilities enable organizations to sense emerging opportunities, seize digital innovations, and transform existing processes in response to environmental changes, which are essential components of DTS (Kamble et al., 2020). Particularly in public sector contexts such as municipalities, the integration of Industry 4.0 technologies supports the development of smart governance systems, enhances service delivery efficiency, and promotes citizen-centric innovation.

Despite these advancements, the literature remains limited in explaining how Industry 4.0 capabilities directly shape digital transformation strategies, especially in non-manufacturing and public sector environments. Most prior studies have focused on operational or technological outcomes, with less attention given to strategic transformation. Addressing this gap, it is argued that Industry 4.0 capabilities act as critical drivers of DTS by providing the technological foundation and organizational competencies necessary for strategic change.

- H_1: Industry 4.0 capabilities positively affect digital transformation strategy.

On another note, Industry 4.0 capabilities have been increasingly recognized as key drivers of organizational readiness for digital transformation (Lu et al., 2024). Prior studies highlight that advanced digital technologies such as artificial intelligence, big data analytics, and cloud computing enhance organizations' ability to develop the necessary technological infrastructure, skills, and competencies required for transformation (Debnath et al., 2023; Gharib et al., 2025; Golovianko et al., 2022). For instance, research shows that the integration of digital technologies improves data accessibility, real-time communication, and decision-making capabilities, thereby strengthening organizational preparedness for digital initiatives (Frank et al., 2019; Kazancoglu et al., 2023; Mbaidin et al., 2023).

Furthermore, Industry 4.0 capabilities contribute to human and managerial readiness by fostering digital skills, enhancing employee adaptability, and promoting a culture of innovation and change (Oommen et al., 2026; Schrauf and Berttram, 2017). These capabilities also enable organizations to develop flexible structures and governance mechanisms that support the adoption and implementation of digital transformation strategies (Dhiaf et al., 2024). In this sense, Industry 4.0 technologies act not only as operational tools but also as enablers of organizational preparedness by aligning technological, human, and structural dimensions. Overall, the literature suggests that organizations equipped with strong Industry 4.0 capabilities are better positioned to build the required readiness for digital transformation, as these capabilities enhance both the technical and organizational foundations necessary for change. Accordingly, it is proposed that:

- H_2: Industry 4.0 capabilities positively affect organizational readiness.

Past literature confirms a positive trend in the relationship between organizational readiness and DTS. Prior studies argue that successful digital transformation requires organizations to possess adequate technological infrastructure, skilled human resources, and a supportive organizational culture to effectively implement digital initiatives (Huang et al., 2023; Mehmood, 2021; Yakut, 2022). For instance, Machado et al. (2021) emphasize that organizations with higher levels of readiness are more capable of aligning digital technologies with strategic objectives, thereby enhancing transformation outcomes. Similarly, Ali and Johl (2023) demonstrate that organizational preparedness significantly influences the successful adoption and execution of digital strategies by improving coordination, decision-making, and resource utilization.

Moreover, Oyekunle and Tiamiyu (2022) suggest that organizational readiness reduces resistance to change and facilitates the integration of advanced technologies into existing processes, enabling organizations to transition toward more agile and data-driven strategic models. In public sector contexts, particularly municipalities, readiness plays a crucial role in overcoming structural rigidity and enabling the effective deployment of digital transformation strategies. Overall, the literature highlights that organizational readiness acts as a foundational enabler that supports the successful formulation and implementation of DTS. In line with these considerations, the following hypothesis is proposed:

- H_3: Organizational readiness positively affects digital transformation strategy.

Furthermore, prior studies emphasize that organizational capabilities often influence strategic outcomes through intermediate mechanisms rather than direct effects alone (Paulraj, 2011). In the context of digital transformation, scholars argue that the successful

translation of technological investments into strategic initiatives depends largely on the organization's level of preparedness and adaptability (Cepeda and Arias-Pérez, 2019; Cordeiro et al., 2023). Specifically, Industry 4.0 capabilities provide the technological foundation for transformation; however, without sufficient organizational readiness, these capabilities may not be effectively leveraged to shape digital transformation strategies (Komkowski et al., 2023).

Existing research suggests that organizational readiness enhances the alignment between technological resources and strategic objectives by facilitating change management, improving employee competencies, and strengthening leadership commitment (Alsmairat, 2023). (Cepeda and Arias-Pérez, 2019) highlight that readiness enables organizations to integrate digital technologies into existing processes, thereby transforming operational capabilities into strategic outcomes. In public sector contexts, this mediating role becomes even more critical due to structural rigidity and bureaucratic constraints, which require higher levels of readiness to ensure successful transformation. From a dynamic capability perspective, organizational readiness can be viewed as a higher-order capability that enables organizations to reconfigure resources and adapt to digital environments, thereby linking Industry 4.0 capabilities with DTS. Thus, it serves as a crucial mechanism through which technological potential is converted into strategic action. In line with these considerations, the following hypothesis is proposed:

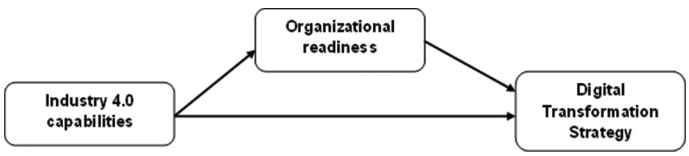
- H_4: Organizational readiness positively mediates the relationship between Industry 4.0 capabilities and digital transformation strategy.

Accordingly, the following research model in Figure 1 is proposed:

4. RESEARCH METHOD

To empirically examine the proposed research model, this study adopts a mixed-methods approach to investigate the impact of Industry 4.0 capabilities on DTS through the mediating role of organizational readiness in Omani municipalities. A combination of quantitative survey data and qualitative insights is employed to ensure both methodological rigor and contextual depth. While survey-based research may be subject to self-report bias, it remains an effective approach for capturing respondents' perceptions of technological capabilities, organizational preparedness, and strategic transformation initiatives. Using a stratified random sampling technique, 400 respondents from Omani municipalities were surveyed to ensure representation across different managerial levels, departments, and levels of involvement in digital initiatives. This sampling approach enhances the generalizability of the findings and ensures adequate representation of diverse organizational perspectives. A screening question was included to confirm that respondents had prior experience with digital systems, Industry 4.0 technologies, or digital transformation initiatives within their organizations. The final sample achieved a 95% confidence level with a ±5% margin of error (Creswell, 2003).

Figure 1: Research model



To mitigate potential common method variance (CMV), several procedural remedies were applied. Respondents were assured of anonymity and confidentiality to reduce social desirability bias. Additionally, survey items were carefully structured and separated by construct to minimize response pattern bias. Harman's single-factor test was conducted, and the first factor accounted for <50% of the total variance, indicating that CMV was not a major concern.

Regarding measurement, multi-item scales were adapted from established literature to ensure reliability and validity. Industry 4.0 capabilities were operationalized using items reflecting the adoption and integration of advanced technologies such as AI, big data analytics, and cloud computing. Organizational readiness was measured through indicators capturing technological infrastructure, employee competencies, leadership support, and cultural openness to change. DTS was assessed using items reflecting strategic alignment, digital integration, and the extent of transformation in organizational processes. All constructs were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), ensuring consistency and interpretability of responses. For data analysis, structural equation modeling (SEM) was employed using SmartPLS version 4, which is particularly suitable for testing complex mediation models and simultaneously assessing measurement and structural relationships (Hair et al., 2022).

5. ANAYLSIS

5.1. Measurement Model

The measurement model was assessed to ensure reliability and validity in accordance with the guidelines of (Hair et al., 2022). Key indicators, including factor loadings, Cronbach's alpha (Cα), composite reliability (CR), and average variance extracted (AVE), were evaluated.

The results reported in Table 1 demonstrate that all measurement items loaded significantly on their respective constructs, with factor loadings exceeding the recommended threshold of 0.70, thereby confirming indicator reliability. In addition, Cronbach's

Table 1: The measurement model assessment

Construct	Code	Loading	Cronbach's alpha	CR	AVE
I4C	I4C1	0.81	0.88	0.91	0.72
	I4C2	0.85			
	I4C3	0.87			
	I4C4	0.83			
OR	OR1	0.82	0.87	0.90	0.69
	OR2	0.84			
	OR3	0.86			
	OR4	0.81			
DTS	DTS1	0.83	0.89	0.92	0.74
	DTS2	0.88			
	DTS3	0.86			
	DTS4	0.84			

alpha and composite reliability values for all constructs were above 0.80, indicating strong internal consistency. Furthermore, the AVE values for all constructs exceeded the acceptable threshold of 0.50, confirming convergent validity. Discriminant validity was assessed using the Fornell–Larcker criterion (Fornell and Larcker, 1981). As presented in Table 2, the square root of the AVE for each construct was greater than its correlations with other constructs, confirming adequate discriminant validity and ensuring that each construct is empirically distinct from the others.

5.2. Assessment of Structural Model

Following the establishment of measurement validity, the structural model was evaluated to examine the hypothesized relationships. The coefficient of determination (R^2) values indicate satisfactory explanatory power, with $R^2 = 0.398$ for Organizational Readiness and $R^2 = 0.641$ for DTS. These results suggest that Industry 4.0 capabilities explain a substantial proportion of variance in organizational readiness, while both Industry 4.0 capabilities and organizational readiness jointly explain a significant portion of variance in DTS. The overall model fit was assessed using the standardized root mean square residual (SRMR). The SRMR value was 0.055, which is below the recommended threshold of 0.08, indicating a good model fit. Additionally, predictive relevance (Q^2) values were above zero for all endogenous constructs, confirming the model's predictive capability. To test the significance of the hypothesized relationships, a bootstrapping procedure with 5,000 resamples was conducted. The results of the direct effects are presented in Table 3, providing evidence for the proposed relationships among Industry 4.0 capabilities, organizational readiness, and DTS.

5.3. Hypotheses Testing

The results indicate that the direct effect of Industry 4.0 capabilities (I4C) on DTS is positive and statistically significant at the 1% level (path coefficient = 0.412, $P < 0.001$); therefore, H1 is supported. Similarly, the effect of I4C on organizational readiness (OR) is positive and significant (path coefficient = 0.631, $P < 0.001$), supporting H_2. These findings confirm that Industry 4.0 capabilities substantially enhance both organizational preparedness and strategic digital transformation efforts.

Regarding the role of organizational readiness, the results show that OR has a positive and significant effect on DTS (path coefficient = 0.487, $P < 0.001$), thereby supporting H3. This suggests that municipalities with higher levels of readiness are more capable of formulating and implementing effective digital transformation strategies.

Table 3 presents the mediation analysis results using bootstrapping procedures. The findings reveal that the indirect effect of I4C on DTS through organizational readiness is positive and significant ($\beta = 0.307$, $P < 0.001$), supporting H_4. This indicates that organizational readiness plays a critical mediating role in translating Industry 4.0 capabilities into strategic digital transformation outcomes. Furthermore, the direct effect of I4C on DTS remains significant even after including the mediator, suggesting the presence of partial mediation.

6. DISCUSSION

Municipal organizations are increasingly leveraging advanced digital technologies to enhance service delivery, governance efficiency, and strategic responsiveness. Despite the growing importance of DTS, the mechanisms through which Industry 4.0 capabilities translate into effective strategic outcomes have received limited scholarly attention, particularly in public sector contexts such as Omani municipalities (Bari et al., 2022; Onwu et al., 2026). Addressing this gap, the present study draws on the PBV alongside the RBV and DCV to explain how organizational readiness acts as a critical mechanism linking Industry 4.0 capabilities and DTS. Based on SEM analysis, the empirical findings provide strong support for the proposed relationships and extend the existing body of knowledge regarding digital transformation in municipal settings. Table 3 presents a summary of the hypothesis testing results, offering evidence-based support for all proposed hypotheses. Collectively, these findings contribute to theory by advancing the understanding of how technological capabilities, organizational preparedness, and strategic transformation interact within public sector organizations.

Consistent with prior literature, the findings confirm that Industry 4.0 capabilities significantly influence DTS (H_1). This result aligns with studies suggesting that advanced technologies such as AI, IoT, and big data analytics enhance decision-making, improve coordination, and enable data-driven strategic planning in organizations (Frank et al., 2019; Agrawal et al., 2020). However, unlike traditional perspectives that focus primarily on technological adoption, the present study highlights that Industry 4.0 capabilities contribute to broader strategic transformation by enabling municipalities to develop adaptive and responsive governance systems (Kamble et al., 2020; Lu et al., 2024). Furthermore, the results indicate that Industry 4.0 capabilities positively affect organizational readiness (H_2). This finding supports prior research emphasizing that digital technologies enhance not only technical infrastructure but also human and managerial capabilities, thereby strengthening organizational

Table 2: Discriminant validity (Fornell–Larcker criterion)

Construct	I4C	OR	DTS
I4C (Industry 4.0 capabilities)	**0.849**		
OR (Organizational readiness)	0.63	**0.831**	
DTS (Digital transformation strategy)	0.58	0.66	**0.860**

The bold valuse are the square root of the AVE

Table 3: Structural model results and mediation analysis

Hypothesis	Relationship	Effect type	Path coefficient (β)	T-value	P-value	Decision
H_1	I4C→DTS	Direct	0.412	7.215	0.000	Supported
H_2	I4C→OR	Direct	0.631	12.384	0.000	Supported
H_3	OR→DTS	Direct	0.487	8.102	0.000	Supported
H_4	I4C→OR→DTS	Indirect (mediation)	0.307	6.458	0.000	Supported

preparedness for transformation (Debnath et al., 2023; Golovianko et al., 2022). In this context, municipalities with stronger Industry 4.0 capabilities are better positioned to develop the necessary skills, leadership support, and cultural openness required for digital transformation (Schrauf and Berttram, 2017; Dhiaf et al., 2024).

In addition, organizational readiness was found to have a significant positive impact on DTS (H_3). This finding corroborates earlier studies that highlight the importance of readiness in facilitating the successful implementation of digital strategies (Huang et al., 2023; Yakut, 2022). Specifically, organizational readiness enhances the alignment between digital technologies and strategic objectives, reduces resistance to change, and enables more effective integration of digital solutions into organizational processes (Ali and Johl, 2023; Oyekunle and Tiamiyu, 2022).

Most importantly, the results confirm the mediating role of organizational readiness in the relationship between Industry 4.0 capabilities and DTS (H_4). This finding provides a novel contribution by demonstrating that the impact of Industry 4.0 capabilities on DTS is not purely direct but operates significantly through organizational readiness. In line with DCV, this suggests that readiness functions as a higher-order capability that enables organizations to reconfigure technological resources into strategic outcomes (Cepeda and Arias-Pérez, 2019; Cordeiro et al., 2023). Particularly in municipal contexts characterized by bureaucratic complexity, readiness plays a crucial role in ensuring that technological investments lead to meaningful strategic transformation (Komkowski et al., 2023).

7. CONCLUSION

The rapid evolution of digital technologies has positioned Industry 4.0 capabilities as a critical driver of transformation in public sector organizations. This study set out to examine how these capabilities influence DTS in Omani municipalities, with a particular focus on the mediating role of organizational readiness. Drawing on the RBV, DCV, and PBV, a comprehensive model was developed and empirically tested using SEM. The findings reveal that Industry 4.0 capabilities significantly enhance DTS both directly and indirectly through organizational readiness. Specifically, Industry 4.0 capabilities were found to strengthen organizational readiness by improving technological infrastructure, employee competencies, and managerial support. In turn, organizational readiness significantly contributes to the successful formulation and implementation of digital transformation strategies. Most importantly, the study confirms that organizational readiness partially mediates the relationship between Industry 4.0 capabilities and DTS, highlighting its crucial role as a bridging mechanism between technological potential and strategic execution.

7.1. Theoretical Implications

This study offers several important contributions to the literature. First, it extends existing research on Industry 4.0 and digital transformation by focusing on the public sector, particularly municipalities, which remain underexplored compared to manufacturing and private sector contexts. Second, the study advances theory by integrating RBV, DCV, and PBV to provide a comprehensive framework explaining how Industry 4.0 capabilities translate into strategic outcomes. Third, the study highlights the critical role of organizational readiness as a mediating construct, offering a more nuanced understanding of the mechanisms through which technological capabilities influence DTS. While prior research has primarily examined direct relationships, this study demonstrates that readiness functions as a higher-order dynamic capability that enables organizations to reconfigure resources and implement transformation effectively.

Fourth, the study contributes methodologically by validating measurement scales for Industry 4.0 capabilities, organizational readiness, and DTS within a municipal context using SEM. These validated constructs can serve as a foundation for future research in similar contexts. Finally, the findings open new avenues for research by emphasizing the importance of intermediate mechanisms in digital transformation, encouraging scholars to explore additional mediators and moderators.

7.2. Managerial Implications

The findings of this study provide valuable insights for policymakers and municipal managers involved in digital transformation initiatives. First, the results highlight that investments in Industry 4.0 technologies alone are insufficient to achieve effective transformation. Municipalities must also focus on developing organizational readiness by strengthening IT infrastructure, enhancing employee digital skills, and fostering a culture that supports innovation and change. Second, leaders should prioritize top management commitment and strategic alignment, as leadership plays a crucial role in driving readiness and ensuring the successful implementation of digital transformation strategies. Training programs, continuous learning, and capacity-building initiatives are essential to equip employees with the necessary competencies to leverage digital technologies effectively.

Third, municipalities should adopt a holistic approach to digital transformation, integrating technological, organizational, and strategic dimensions rather than focusing solely on technical solutions. This includes redesigning processes, improving governance structures, and aligning digital initiatives with long-term strategic goals. Finally, decision-makers should recognize the importance of organizational readiness as a strategic enabler, ensuring that digital transformation initiatives are supported by adequate resources, capabilities, and institutional support. By doing so, municipalities can enhance service delivery, improve operational efficiency, and better respond to evolving citizen needs in an increasingly digital environment.

7.3. Limitations and Future Research

Despite its contributions, this study has several limitations. First, the use of cross-sectional survey data may limit the ability to capture dynamic changes over time. Future research could adopt longitudinal designs to better understand the evolution of digital transformation processes. Second, the study relies on self-reported data, which may introduce potential bias. Future studies could incorporate objective performance indicators to enhance robustness. Third, the study focuses on municipalities in Oman, which may limit the generalizability of the findings. Future

research could examine similar models in different countries or sectors to validate and extend the results. Finally, future studies could explore additional mediating and moderating variables, such as digital leadership, organizational culture, or environmental uncertainty, to provide a more comprehensive understanding of digital transformation dynamics.

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