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Digital Maturity Profiles and Big Data Analytics Adoption: A Cluster-Based Analysis from Albania

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ABSTRACT

The implementation of Big Data Analytics (BDA) varies considerably across organizations, reflecting differences in technological capabilities and levels of digital preparedness. This study investigates how digital maturity influences firms' BDA adoption behavior using a segmentation-based methodology rather than traditional factor-based approaches. Digital maturity is operationalized through observable indicators related to organizational system integration, including the use of Human Resource Management (HRM), Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), and accounting information systems. A two-step clustering methodology combining hierarchical clustering (Ward's method) and K-means clustering identifies three distinct digital maturity profiles: high, moderate, and low maturity firms. The relationship between digital maturity and BDA adoption is examined through cross-tabulation and Chi-square analysis. The findings reveal substantial heterogeneity in firms' digital capabilities and demonstrate a statistically significant association between digital maturity and BDA adoption. Firms classified within the high digital maturity profile exhibit an adoption rate of 58.7%, compared to 18.8% among firms with moderate digital maturity and 13.3% among firms with low digital maturity. The findings suggest that digital maturity represents an important organizational enabler of analytics adoption and highlight the role of integrated digital systems in strengthening firms' readiness for data-driven transformation.

INTRODUCTION

The swift progression of digital technologies has profoundly altered organizational operations, competition, and value creation. In recent years, the growing accessibility of data and the advancement of sophisticated analytical tools have established data-driven decision-making as central to contemporary business strategies. In this perspective, BDA has become a crucial facilitator of organizational efficiency, innovation, and competitive advantage (Maroufkhani et al., 2020). Firms increasingly rely on analytics capabilities to improve forecasting, optimize processes, and gain deeper insights into market dynamics. Despite these advantages, the implementation of

BDA tools remains markedly inconsistent among enterprises. Some firms have effectively incorporated modern analytical tools into their operations, while others continue to rely on conventional data processing methods or demonstrate minimal engagement with data-driven activities. This variation indicates that the implementation of BDA is influenced not only by technological access but also by differences in organizational capabilities, system integration, and preparedness for digital transformation. Previous studies emphasize that BDA capability significantly enhances organizational performance and decision-making quality (Mikalef et al., 2017).

A key concept for explaining these differences is digital maturity, which refers to the extent to which firms have integrated digital technologies, processes, and capabilities into their organizational operations (Gökalp & Martinez, 2021; OECD, 2022). Organizations exhibiting higher levels of digital maturity generally possess more integrated technological systems, stronger data management capabilities, and organizational structures that facilitate data-driven decision-making. Conversely, less digitally mature firms frequently face structural and strategic limitations that hinder their ability to adopt advanced technologies. The significance of digital maturity is particularly evident in developing economies, where digital transformation initiatives are still evolving. In Albania, despite improvements in digital infrastructure and access to information technology, the adoption of sophisticated digital solutions remains relatively limited compared to European standards. This creates a context characterized by considerable heterogeneity, in which enterprises operate at different stages of digital development. Current research predominantly investigates technology adoption through factor-based methodologies, emphasizing the influence of individual variables. Nevertheless, these approaches frequently assume homogeneity among organizations and may overlook fundamental structural differences in firms' digital capabilities. Consequently, there remains limited evidence on how firms with different levels of digital maturity systematically differ in their adoption of advanced analytics technologies, particularly in developing economies. In contrast, a segmentation-based approach enables the identification of distinct organizational profiles, offering a more nuanced understanding of adoption behavior. In this context, cluster analysis provides an appropriate analytical framework by facilitating the classification of enterprises into groups with similar characteristics. Categorizing firms according to levels of digital maturity—high, moderate, and low—allows for a clearer understanding of how differences in digital system integration influence variations in BDA adoption. This study seeks to investigate the relationship between digital maturity and the adoption of Big Data Analytics through a cluster-based methodology. Specifically, the study (i) identifies distinct digital maturity profiles among organizations and (ii) examines differences in BDA adoption across these profiles. By moving beyond conventional binary approaches, the study advances a more nuanced empirical understanding of how organizational heterogeneity influences technology adoption.

1. LITERATURE REVIEW

Digital transformation has emerged as a pivotal catalyst for organizational change, impacting not just the technologies that businesses implement but also their process structuring, decision-making, and competitive advantage creation. In the literature, digitalization is perceived not merely as the use of information technologies, but as a comprehensive organizational change that encompasses the integration of digital infrastructure, business processes, competences, and managerial practices. In this context, the notion of digital maturity has become increasingly significant, since it offers a framework for evaluating the degree to which businesses have effectively integrated digital technology into their operations (Gökalp & Martinez, 2021). The discourse on digital transformation is especially pertinent in the context of Albania. Although the nation has succeeded in enhancing digital infrastructure and increasing access to information technology, the implementation of sophisticated digital solutions by enterprises remains inconsistent. Reports from national and international sources demonstrate that while fundamental digital tools are broadly accessible, the adoption of advanced technologies remains relatively limited compared to European Union benchmarks. This indicates that businesses function within

a framework where the principles of digitalization are being developed; however, the shift towards sophisticated, data-centric methodologies remains in its nascent phase (European Commission, 2022).

From this viewpoint, digital maturity provides a more thorough framework for examining firm-level disparities than mere indications of technology utilization. Maturity models encompass both the existence of digital tools and the extent to which businesses have cultivated strategies, structures, skills, and governance frameworks to utilize them effectively. Gökalp and Martinez (2021) contend that effective maturity models must allow businesses to evaluate their present condition, pinpoint capability deficiencies, and establish systematic routes for transformation. The OECD (2022) defines digital maturity as a self-assessment and strategy alignment instrument rather than a fixed classification, highlighting its function in facilitating organizational progress. Recent research indicates that digital maturity can be efficiently analyzed using cluster-based methodologies, as organizations do not adhere to a standardized trajectory of digital transformation. Clustering techniques enable researchers to identify various categories of firms—such as low, moderate, and high digital maturity—based on their organizational digital systems and integration profiles rather than assuming linear or homogeneous development. In practice, organizational digital maturity is often reflected through the integration of enterprise systems such as HRM, CRM, ERP, and accounting information systems, which facilitate coordination, information exchange, and data-driven operational processes. Empirical studies indicate that this segmentation clarifies the distinctions among organizations regarding their digital capabilities and transformation pathways. Pinto et al. (2023) demonstrate that businesses can be effectively categorized based on their level of digital advancement, revealing structured trajectories toward higher maturity levels. Jäkel et al. (2024) argue that maturity models become more informative when used to classify enterprises into comparable groups, particularly in industries experiencing rapid technological transformation. This perspective is particularly relevant for understanding the adoption of data analytics, especially BDA. The literature consistently emphasizes that BDA adoption is not merely a technological decision but a complex organizational process requiring adequate systems, skilled human resources, and the ability to integrate data into decision-making processes. Organizations exhibiting higher digital maturity are generally more capable of implementing advanced analytics technologies because they possess more integrated organizational systems, stronger data management processes, and organizational structures that support data-driven decision-making. Conversely, organizations with lower maturity levels frequently encounter significant barriers, including limited resources, insufficient experience, and weak organizational alignment (Maroufkhani et al., 2020; Gökalp & Martinez, 2021). This relationship suggests that BDA adoption should not be examined solely as a binary outcome (adopter versus non-adopter), but rather in relation to different levels of digital maturity. Firms at different stages of digital development exhibit varying capacities to integrate and utilize advanced technologies, resulting in substantial differences in adoption patterns. Consequently, cluster analysis provides a theoretically robust and empirically appropriate approach for investigating this heterogeneity, enabling researchers to identify distinct organizational profiles and evaluate differences in adoption behavior across them (Pinto et al., 2023). This approach is particularly appropriate in the Albanian context due to the uneven nature of digital transformation among enterprises. Although aggregate statistics indicate progress, firms are likely to operate at substantially different levels of digital development, ranging from organizations with relatively integrated digital systems to firms still at early stages of digitalization. The literature supports this interpretation, as segmentation according to digital maturity provides a more nuanced and accurate understanding of organizational behavior than aggregate-level analysis (Pinto et al., 2023; Jäkel et al., 2024). The literature highlights three central insights relevant to this study. First, digital transformation is a multidimensional process that extends beyond the simple adoption of individual technologies.

Second, digital maturity provides a comprehensive framework for distinguishing differences among organizations and classifying them into meaningful profiles. Third, organizations with higher levels of digital maturity are generally more likely to adopt advanced analytics solutions, thereby

establishing a strong theoretical foundation for examining BDA adoption through cluster-based segmentation (Gökalp & Martinez, 2021; Maroufkhani et al., 2020).

2. METHODOLOGY

2.1 Research Design and Data Collection

This research employs a quantitative, cross-sectional design utilizing primary data gathered using a structured questionnaire. The survey focused on large taxpayers in Albania, gathering data on their digital capabilities, organizational structures, and use of data analytics methodologies. The final sample comprises 121 valid observations. The study's dependent variable is BDA adoption, defined as a binary variable (1 = adopter, 0 = non-adopter). The research design seeks to investigate the variability among organizations regarding their digital capabilities and to evaluate the relationship between these differences and the implementation of advanced analytical technologies. The questionnaire consisted of multiple sections covering firm characteristics, digital systems utilization, and the adoption of BDA. The instrument included primarily closed-ended questions and was administered to firm representatives involved in managerial, technological, or operational activities. The selected indicators were intended to capture observable aspects of firms' organizational digital systems and system integration. This study employed a segmentation-based methodology centered on the concept of digital maturity rather than traditional factor-based models. Digital maturity refers to the extent to which organizations have integrated digital systems and technological capabilities into their operations. The variables used in the clustering procedure were operationalized as observable organizational indicators reflecting the presence and utilization of digital systems within firms. Specifically, firms were asked whether they used HRM systems, CRM systems, ERP systems, and accounting information systems in their organizational activities. These variables were coded as binary indicators (1 = yes, 0 = no). The analysis emphasizes key indicators representing firms' organizational system integration and digital system utilization, including the implementation of HRM, utilization of CRM, adoption of ERP, and the use of accounting information systems. Accordingly, digital maturity in this study is not treated as a latent psychometric construct measured through reflective perceptual scales, but rather as a proxy-based organizational construct represented through observable organizational and technological characteristics. It is important to note that digital maturity is a multidimensional construct extending beyond the selected indicators. In this study, digital maturity is approximated through a set of observable proxies related to digital system utilization and organizational integration. Although these indicators do not capture all dimensions of digital maturity—such as strategy, culture, and governance—they provide a consistent and empirically measurable representation suitable for segmentation analysis. This approach facilitates the identification of latent organizational profiles rather than isolating the effects of individual variables. The selection of variables for clustering was determined by two criteria: conceptual relevance to digital maturity and statistical stability in clustering methodologies. Prior to clustering, all selected variables were standardized using z-scores to ensure comparability and balanced contribution of each indicator to the clustering solution. All statistical analyses were performed using RStudio. Cluster analysis is widely recognized as a robust technique for identifying homogeneous groups within heterogeneous populations (Hair et al., 2019).

It has been extensively used in strategic and organizational research to uncover latent structures. The identification of organizational profiles was conducted through a two-step clustering methodology:

2.1.1 Hierarchical Clustering

A hierarchical cluster analysis was conducted in the initial phase utilizing Ward's linkage approach and the Squared Euclidean distance metric. Ward's method was selected because it minimizes within-cluster variance and produces relatively homogeneous clusters, making it

particularly suitable for organizational segmentation studies. The hierarchical method was employed to investigate the fundamental structure of the data and to determine the optimal number of clusters. The decision was based on the examination of the agglomeration schedule, wherein a significant rise in coefficients throughout the last phases signified the suitable cut-off point.

2.1.2 K-means Clustering

During the second phase, a K-means clustering technique was utilized to enhance the cluster solution and allocate each firm to a designated group. A three-cluster approach was chosen based on the hierarchical results, since it offered a compromise between interpretability and within-cluster homogeneity. The combined use of hierarchical and K-means clustering is consistent with prior methodological recommendations in segmentation research, as hierarchical clustering assists in determining the optimal number of clusters, whereas K-means improves cluster stability and classification accuracy. The method converged swiftly, indicating stable cluster centroids and clear group separation. Following cluster creation, the resultant groupings were analyzed and interpreted according to their standardized mean values across the chosen variables. Each cluster was designated based on its degree of digital maturity: Firms with high digital maturity, firms with moderate digital maturity, and firms with low digital maturity. This designation indicates the comparative placement of each cluster regarding organizational digital integration and system utilization. The final cluster solution demonstrated clear separation across variables and acceptable cluster sizes, supporting its robustness and interpretability.

2.2 Association Between Digital Maturity and BDA Adoption

A Chi-square test of independence was performed to evaluate the relationship between the identified digital maturity profiles and the adoption of BDA. This test assesses whether a statistically significant association exists between cluster membership (a categorical variable with three groups) and BDA adoption (a binary variable). The analysis incorporates cross-tabulation using row and column percentages to illustrate adoption patterns across clusters. The study's analytical strategy is organized into two complementary phases: (i) classification of enterprises according to digital maturity through cluster analysis, and (ii) evaluation of BDA adoption patterns across the identified profiles using cross-tabulation and Chi-square testing. This methodology enables the study to move beyond conventional linear modeling by capturing heterogeneity in organizational behavior and providing a more nuanced understanding of the relationship between digital maturity and BDA adoption.

3. RESULTS

The optimal number of clusters was established using hierarchical cluster analysis utilizing Ward's approach and Squared Euclidean distance. The agglomeration schedule revealed a significant rise in fusion coefficients throughout the last stages, endorsing a three-cluster solution as the most suitable. Further clustering would have led to a significant reduction in between-group heterogeneity.

Table 1. Final Cluster Centers (Standardized Values)

Digital Maturity Profile	HRM	CRM	ERP	Accounting
Low Digital Maturity	0.13	0.27	0.10	1.00
Moderate Digital Maturity	0.38	0.19	0.12	0.00
High Digital Maturity	0.93	0.93	0.84	1.00

Source: Author's Calculations

Table 1 presents the mean values of the digital system indicators across the three identified digital maturity profiles. The results reveal clear differences in the extent of system integration among firms.

- Firms classified as having high digital maturity exhibit the highest levels of HRM (0.93), CRM (0.93), and ERP system utilization (0.84), together with widespread use of accounting systems (1.00). This profile represents organizations with relatively high levels of organizational digital integration.
- The moderate digital maturity profile demonstrates limited use of HRM (0.38), CRM (0.19), and ERP systems (0.12), while accounting system utilization is absent in this group (0.00). These firms appear to be in an intermediate stage of digital development.
- Firms belonging to the low digital maturity profile show the weakest levels of digital system integration, particularly for HRM (0.13) and ERP systems (0.10), although accounting system utilization remains present (1.00).

The cluster solution indicates meaningful heterogeneity in firms' organizational digital systems and technological capabilities.

Table 2. Distribution of Firms Across Clusters

Cluster	N	%
High Digital Maturity	75	62%
Moderate Digital Maturity	16	13.2%
Low Digital Maturity	30	24.8%

Source: Author's Calculations

Table 2 presents the distribution of firms across the identified digital maturity profiles. The findings indicate that most firms (62%) belong to the high digital maturity group, suggesting relatively widespread adoption of core organizational digital systems among the surveyed enterprises. Approximately one-quarter of firms (24.8%) are classified within the low digital maturity profile, indicating limited integration of digital systems and weaker technological capabilities. The smallest segment (13.2%) corresponds to firms with moderate digital maturity. The distribution highlights the existence of considerable heterogeneity in firms' levels of digital development and system integration.

Table 3. BDA Adoption by Digital Maturity Clusters

Cluster	Non-Adopters	Adopters	Adoption Rate (%)
High Maturity	31	44	58.7%
Moderate Maturity	13	3	18.8%
Low Maturity	26	4	13.3%

Source: Author's Calculations

Table 3 illustrates the distribution of BDA adoption across the three digital maturity profiles and reveals a strong relationship between digital maturity and adoption behavior. Firms classified as having high digital maturity demonstrate substantially higher BDA adoption rates (58.7%) compared to firms operating at low (13.3%) and moderate (18.8%) levels of digital maturity. These findings suggest that firms with more integrated organizational digital systems and broader use of organizational information systems are considerably more likely to adopt advanced analytics technologies. In contrast, firms with lower levels of digital maturity appear to face structural and technological limitations that hinder the implementation of BDA solutions.

Table 4. Chi-Square Test of Association Between Digital Maturity and BDA Adoption

Test	Value
Pearson Chi-Square	22.201
Degrees of Freedom	2
p-value	< 0.001
Cramer's V	0.428

Source: Author's Calculations

The Chi-square test of independence confirmed a statistically significant association between digital maturity and BDA adoption, $\chi^2(2) = 22.201$, $p < .001$ (Table 4). The strength of the

relationship was moderately strong (Cramer's $V = 0.428$), indicating a meaningful association between firms' digital maturity profiles and their likelihood of adopting BDA.

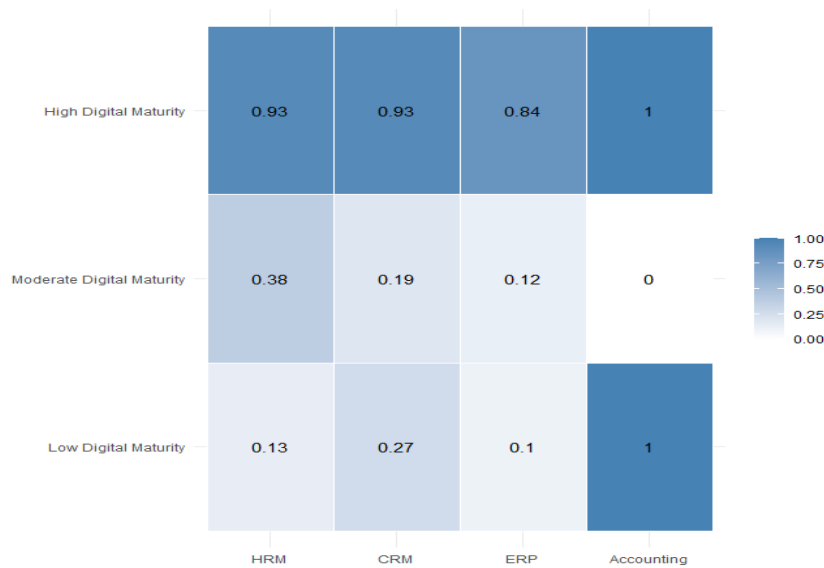


Figure 1. Digital Maturity Profiles Across Technological Indicators
Source: Author's Calculations

Figure 1 illustrates the distribution of digital system utilization across the three identified digital maturity profiles. The heatmap reveals clear differences in the level of organizational digital integration among firms. Firms classified within the high digital maturity profile exhibit the strongest levels of digital system utilization across all indicators, particularly HRM (0.93), CRM (0.93), ERP (0.84), and accounting systems (1.00). This pattern indicates a relatively advanced level of organizational digital integration. The moderate digital maturity profile demonstrates substantially lower levels of HRM (0.38), CRM (0.19), and ERP system usage (0.12), while accounting system adoption is absent within this group (0.00). These firms appear to occupy an intermediate stage of digital development characterized by partial and fragmented system integration. Firms belonging to the low digital maturity profile exhibit the weakest technological integration overall, particularly in relation to HRM (0.13), CRM (0.27), and ERP systems (0.10). Although accounting system utilization remains present (1.00), the broader adoption of integrated organizational systems remains limited. The results confirm the existence of distinct digital maturity profiles and demonstrate that firms differ substantially in terms of their organizational digital systems and system integration.

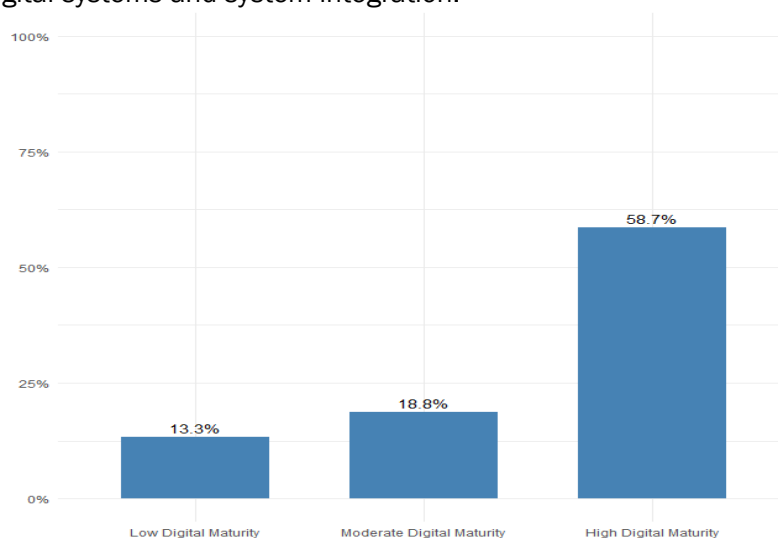


Figure 2. BDA Adoption Rates Across Digital Maturity Profiles

Figure 2 presents the BDA adoption rates across the identified digital maturity profiles. The results reveal substantial differences in the likelihood of adopting BDA according to firms' levels of digital maturity. Firms classified within the high digital maturity profile demonstrate the highest BDA adoption rate (58.7%), substantially exceeding the rates among firms with moderate (18.8%) and low digital maturity (13.3%). These findings indicate that organizations characterized by stronger organizational digital integration are considerably more likely to implement advanced analytics technologies. The differences between the profiles suggest that digital maturity plays a critical role in shaping firms' readiness for data-driven transformation. While firms with low and moderate digital maturity demonstrate relatively limited engagement with BDA, organizations with highly integrated digital systems appear substantially more prepared to adopt sophisticated analytical practices.

4. DISCUSSION

The findings of this study demonstrate that digital maturity significantly influences organizations' adoption of BDA. The cluster analysis identified three distinct digital maturity profiles—high, moderate, and low maturity—which differ substantially in terms of organizational system integration and digital systems utilization. The results reveal a clear gradient in adoption behavior across these profiles. Firms classified within the high digital maturity profile exhibit substantially higher BDA adoption rates compared to firms operating at moderate and low levels of digital maturity. Specifically, firms with high digital maturity demonstrate an adoption rate of 58.7%, compared to 18.8% among firms with moderate maturity and 13.3% among firms with low digital maturity. This pattern suggests that digital maturity is closely associated with organizations' ability to implement advanced analytical technologies. In particular, the considerably higher adoption rate observed among highly mature firms indicates that the presence of integrated organizational systems creates favorable conditions for analytics implementation and data-driven decision-making. These findings are consistent with previous studies emphasizing that the adoption of advanced technologies depends not only on technological access but also on the existence of complementary organizational capabilities and integrated digital systems (Maroufkhani et al., 2020; Gökalp & Martinez, 2021). Firms with stronger digital integration appear better positioned to collect, process, and utilize information efficiently, thereby increasing their capacity to implement analytics solutions. Conversely, firms with lower levels of digital maturity frequently encounter structural constraints, including fragmented systems, limited organizational integration, insufficient technological capabilities, and weaker readiness for digital transformation, all of which may hinder BDA adoption. An important contribution of this study lies in its methodological approach. By adopting a cluster-based perspective, the research demonstrates that organizations should not be treated as homogeneous entities in technology adoption studies. Instead, firms differ systematically in terms of their digital maturity configurations, resulting in distinct adoption trajectories. This contributes to the growing literature emphasizing organizational heterogeneity in digital transformation processes. Unlike traditional factor-based approaches that focus primarily on the isolated effects of individual variables, the segmentation-based methodology employed in this study identifies distinct organizational profiles and demonstrates that adoption behavior varies systematically according to firms' levels of digital maturity. By capturing this heterogeneity, the study provides a more nuanced understanding of the adoption process and highlights that organizations at different stages of digital development follow different technological pathways. The findings further suggest that the relationship between digital maturity and BDA adoption is profile-dependent rather than purely linear. Firms characterized by stronger integration of organizational systems appear substantially more capable of adopting advanced analytical practices compared to firms operating with fragmented or less developed digital systems. The statistically significant Chi-square results further reinforce this interpretation, indicating a meaningful association between digital maturity profiles and BDA adoption behavior. These findings therefore support the argument that digital maturity functions as an important organizational enabler of advanced analytics adoption. The findings are particularly relevant in the

context of Albania, where digital transformation remains uneven across enterprises. The distribution of firms across clusters indicates that organizations operate at substantially different levels of digital development and system integration. Although a considerable proportion of firms demonstrate relatively high levels of digital maturity, BDA adoption remains far from universal, suggesting that digital system integration represents an important enabling condition rather than an automatic guarantee of BDA adoption. This finding has broader implications for developing economies, where uneven digital development frequently generates disparities in firms' innovation capacities and readiness for data-driven transformation. The Albanian context illustrates how differences in organizational digital systems and integration capabilities can translate into substantial inequalities in analytics adoption and data-driven decision-making. The findings are also consistent with prior research emphasizing that digital capabilities play a central role in facilitating the adoption of advanced technologies, particularly in emerging economies where structural constraints are often more pronounced (Aldossari et al., 2025). From a managerial perspective, the results suggest that firms seeking to adopt BDA should prioritize the development of integrated organizational systems before implementing advanced analytics initiatives. Investments in enterprise systems and organizational digital integration appear particularly important for strengthening firms' readiness for data-driven transformation.

CONCLUSION

This study investigated the relationship between digital maturity and the adoption of BDA through a cluster-based methodology focusing on firms operating in Albania. Using hierarchical and K-means clustering techniques, the study identified three distinct digital maturity profiles, revealing substantial heterogeneity in firms' levels of organizational system integration and digital capabilities. The findings demonstrate a statistically significant association between digital maturity and BDA adoption. Firms classified within the high digital maturity profile exhibit substantially higher adoption rates compared to firms operating at moderate and low levels of digital maturity, confirming that organizations with stronger digital integration are more likely to adopt advanced analytics technologies. Theoretically, the study contributes to the literature by moving beyond conventional factor-based approaches and adopting a segmentation-oriented perspective. Rather than examining isolated determinants of technology adoption, the research emphasizes the importance of organizational digital profiles and demonstrates that firms exhibit different levels of readiness for analytics adoption according to their digital maturity configurations. By classifying organizations into distinct maturity profiles, the study advances a more nuanced understanding of how organizational heterogeneity influences technology adoption behavior. This perspective highlights the importance of firm-specific digital configurations rather than assuming uniform adoption patterns across organizations. From a practical perspective, the findings suggest that initiatives aimed at increasing BDA adoption should focus on strengthening firms' organizational digital systems and integration capabilities. Organizations operating with fragmented or underdeveloped digital systems may encounter substantial barriers when attempting to implement advanced analytics technologies. Consequently, managerial strategies should prioritize investments in enterprise systems, organizational digital integration, and capabilities supporting data-driven decision-making processes. From a policy perspective, the findings indicate the importance of supporting firms operating at lower levels of digital maturity. Digital transformation programs, organizational capability development initiatives, and support for enterprise system implementation may help firms overcome structural barriers and improve their readiness for analytics adoption. Such initiatives are particularly important in developing economies, where differences in digital preparedness frequently contribute to unequal access to advanced technologies and innovation opportunities. Despite its contributions, the study is subject to several limitations. First, the analysis relies on a specific sample of firms operating in Albania, which may limit the generalizability of the findings to other contexts. Second, digital maturity is approximated through a limited set of observable organizational system indicators, which do not fully capture broader dimensions such as digital strategy, organizational culture, governance mechanisms, or employee digital competencies. Finally, the cross-sectional nature of the data limits the ability to examine changes in digital maturity and adoption behavior over time. Future

research may extend this study by incorporating additional dimensions of digital maturity, employing longitudinal approaches to capture digital transformation trajectories, or comparing organizational profiles across industries and countries. Further studies could also examine how strategic, cultural, and governance-related dimensions interact with organizational system integration to influence the adoption of advanced analytics technologies.

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