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ZEYNAB GIYASOVA ANAR

DIGITAL READINESS OF SMALL AND MEDIUM ENTERPRISES IN KAZAKHSTAN: CONCEPTUAL FOUNDATIONS AND DEVELOPMENT FACTORS

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Abstract

Digital readiness refers to an organization's preparedness to adopt and effectively utilize digital technologies, and it has become a critical factor for the competitiveness of small and medium-sized enterprises (SMEs). This article examines the digital readiness of SMEs in Kazakhstan by exploring its conceptual foundations and the internal and external factors influencing it. A review of the literature shows that SMEs globally often lag in digital transformation, and Kazakhstan's SMEs are no exception. We discuss key models and frameworks of digital maturity and readiness, and highlight factors such as financial capacity, workforce digital skills, infrastructure quality, leadership commitment, and policy support. Drawing on recent data and studies, we find that despite national initiatives like the *Digital Kazakhstan* program, many Kazakhstani SMEs remain at early stages of digital adoption. Internal challenges (limited resources, lack of skills and strategic foresight) and external barriers (insufficient broadband connectivity, regulatory hurdles) hinder their digital development. The Results and Discussion section presents a summary of these challenges, including a comparative snapshot of SME digital indicators. In conclusion, we emphasize the need for strengthening both internal capabilities and the external enabling environment to improve SME digital readiness in Kazakhstan. This study contributes a consolidated perspective on digital readiness and offers insights for policymakers and SME leaders aiming to drive digital transformation.

Keywords: Digital readiness; SMEs; digital transformation; Kazakhstan; ICT adoption; organizational preparedness; digital economy.

Introduction

The rapid development of the digital economy and the rise of emerging technologies have made digital transformation a necessity rather than an option for businesses of all sizes. An enterprise's digital readiness can be defined as its level of preparedness for digital transformation – the extent to which it is ready to adopt, implement, and benefit from digital technologies in its operations and strategy. Research suggests that a low level of digital readiness (or digital maturity) can adversely impact a firm's competitiveness and profitability. In other words, companies that are not ready to adapt to constantly changing digital environments risk falling behind more agile competitors. This issue is particularly acute for small and medium-sized enterprises (SMEs), which

often have fewer resources and capabilities to leverage digital tools compared to larger firms (Alqam et al., 2024). The global “SME digital gap” has been widening, leading to concerns that the benefits of digital transformation accrue mostly to early adopters, further increasing inequalities among firms (OECD, 2021).

Enabling the digitalization of SMEs has therefore become a top policy priority in many countries (OECD, 2021). Kazakhstan is no exception: as a regional leader in Central Asia, Kazakhstan has launched strategic initiatives to boost digital adoption across its economy. The government’s Digital Kazakhstan program (2018–2022) aimed to accelerate the country’s transition to a digital economy through investments in digital infrastructure, e-government services, and support for innovation in the private sector (World Bank, 2021). SMEs, which contribute about one-third of Kazakhstan’s GDP and a significant share of employment (OECD, 2023), are a critical focus of these digitalization efforts. Improving SME digital readiness is seen as a path to enhance productivity, foster innovation, and ensure inclusive economic growth.

However, despite these initiatives, evidence indicates that the digital readiness of Kazakhstani SMEs remains limited. For instance, recent OECD analysis noted that only around 11% of firms in Kazakhstan report using any form of digital technologies, and this share is likely even lower among SMEs (OECD, 2023). Many small businesses rely predominantly on mobile internet, which in Kazakhstan has relatively low speed and coverage, especially in rural areas, thus constraining effective digital uptake (OECD, 2023). Key prerequisites for SME digital transformation – such as reliable broadband access, digital skills, and supportive regulatory frameworks – remain below their potential (OECD, 2023). These observations underscore the importance of examining both the conceptual foundations of digital readiness and the development factors that influence it in the context of Kazakhstan’s SMEs.

This paper addresses that need by providing a comprehensive overview of SME digital readiness in Kazakhstan. We first review relevant literature and models of digital maturity/readiness (Section Literature Review), including global frameworks and region-specific studies. We then present our findings on the state of SME digital readiness in Kazakhstan, discussing internal and external factors (Section Results and Discussion). A summary table and a visual chart are included to illustrate key points. Finally, Section Conclusion offers concluding remarks and policy implications. By consolidating insights from recent studies and data (including sources such as OECD, World Bank, and academic research), this article aims to contribute a clearer understanding of how Kazakhstani SMEs can progress on their digital transformation journey and what factors are most pivotal in that process.

Literature Review

Digital readiness is often used interchangeably with digital maturity, referring to an organization’s capacity and preparedness to successfully implement digital technologies and transformations. Alenina and Kuritsyna (2024) note that while the concept is widely recognized as important, there is no single, universally accepted method to measure it. Instead, various frameworks exist to evaluate how ready a company is for digital change. Many of these frameworks emerge from the broader notion of organizational readiness for change and digital transformation. For example, Pingali et al. (2023) conceptualize digital readiness for SMEs in emerging markets as a multi-dimensional construct encompassing technological sensemaking, organizational agility, and emerging technology implementation. This implies that a digitally ready SME not only understands new technologies (sensemaking) and stays agile in processes and strategy, but also actively implements relevant innovations.

Researchers have developed numerous models to assess digital readiness or maturity. Table 1 summarizes several influential models and frameworks from the literature and their key features or dimensions.

| Author(s) & Year | Context/Model | Key Features / Dimensions |
|-----------------------------------|--|--|
| Berghaus & Back (2016) | Five-stage Digital Business Transformation Maturity Model. Developed from a survey of 417 firms (Switzerland & Germany). | Proposes 5 maturity stages derived via cluster analysis across 9 dimensions of digital maturity. Early stages involve ad-hoc digital experiments and basic digital awareness, while later stages see strategic integration of digital technologies. Emphasizes that many firms struggle to progress to strategic transformation (e.g., usage of advanced analytics is less common). |
| Furjan et al. (2020) | Digital Transformation Initiatives – Case Studies (Croatia). | Highlights practical aspects of digital transformation in SMEs through case analysis. Finds that adopting even a single new digital process can require significant changes in organizational logic and culture. Introduces the idea of “Digital Darwinism,” where the ability to adapt digitally is tied to business survival. Stresses the need for aligning technology implementation with business value. |
| Buganova et al. (2022) | Digital Transformation Readiness – Kazakhstan Overview. | Analyzes Kazakhstan’s digital economy using global indices and SWOT analysis. Considers baseline concepts (digitization vs. digitalization) and uses indices like the World Digital Competitiveness Index (WDCI) to gauge readiness. Identifies strengths (e.g., government commitment, growing ICT sector) and weaknesses (e.g., gaps in infrastructure and skills) in Kazakhstan’s digital landscape. |
| Yezhebay et al. (2021) | Kazakhstan SME Digital Maturity Model (IEEE Conference paper). | Develops a tailored maturity model for Kazakhstani SMEs. The model consists of 6 key dimensions (with 15 sub-dimensions) relevant to SME digital transformation in Kazakhstan, and defines 6 levels of digital readiness. Validated via a survey of SME managers, it helps identify specific areas (dimensions) where SMEs need improvement and provides recommendations to progress to higher maturity levels. |
| Barry et al. (2023) | Comparative Analysis of Digital Maturity Models (Global scope). | Reviews 8 prominent digital maturity models across different domains. Identifies common strengths (e.g., comprehensive multi-dimensional assessment) and weaknesses (e.g., lack of adaptability to all sectors) of these models. Concludes that no single model fits all contexts; for instance, the <i>Digital Internet Maturity Model (DIMM)</i> was found to have the broadest applicability across sectors, while others are more domain-specific. Reinforces the idea that digital maturity models must be selected or adapted to the specific needs of the organization or sector. |

| | | |
|------------------------------|--|---|
| Pingali et al. (2023) | Digital Readiness in Emerging Markets (Conceptual framework). | Proposes that SME digital readiness comprises three core elements: technological sensemaking (awareness and understanding of digital tech), agility (ability to rapidly adapt processes and strategies), and technology implementation (capacity to adopt new digital tools). Suggests that higher readiness in these areas enables SMEs to better respond to disruptive changes and improves overall performance. Provides a measurement approach and discusses implications for emerging economies where SMEs face resource constraints. |
| Alqam et al. (2024) | Digital Readiness & Dynamic Capabilities (Oman, conceptual study). | Integrates digital readiness with strategic management concepts. The authors develop a framework linking digital readiness, strategic foresight, and strategic flexibility as drivers of SME digitalization and performance. They argue that an SME's readiness to embrace digital technology, combined with its ability to anticipate future trends (foresight) and to pivot or reconfigure resources (flexibility), significantly influences the success of its digital initiatives. This highlights internal leadership and vision as part of digital readiness. |

Table 1. Selected models and frameworks of digital readiness/digital maturity and their key characteristics.

In summary, the literature illustrates that digital readiness is a multifaceted concept. Various models emphasize different aspects – from cultural and strategic factors (e.g., agility, leadership) to technological infrastructure and skills. Importantly, scholars agree on the critical influence of digital readiness on transformation outcomes. As Barry et al. (2023) and Tarasova et al. (2023) both underscore, organizations must assess their readiness across multiple dimensions to identify “problem areas” that could hinder digital initiatives. In the context of SMEs, internal constraints (limited financial and human resources) often intersect with external pressures (market and technological changes). The next section will focus on how these general concepts apply to Kazakhstan’s SMEs, drawing on recent studies and data to discuss the specific factors affecting digital readiness and the current level of digital maturity among these firms.

Results and Discussion

Evidence from international assessments and local studies suggests that many SMEs in Kazakhstan are at an early stage of digital readiness. As noted earlier, only about 11% of Kazakhstani firms report using digital technologies in their business processes (OECD, 2023). Even a basic indicator like having a company website is not universal among SMEs: according to a World Bank survey, only 46.5% of small firms and 57% of medium firms in Kazakhstan had their own website as of 2020, compared to an average of 62.8% in the Europe & Central Asia region (World Bank, 2021). Figure 1 illustrates this gap in web presence, which serves as a proxy for digital engagement. The lag in such foundational aspects of digital adoption points to underlying readiness issues.

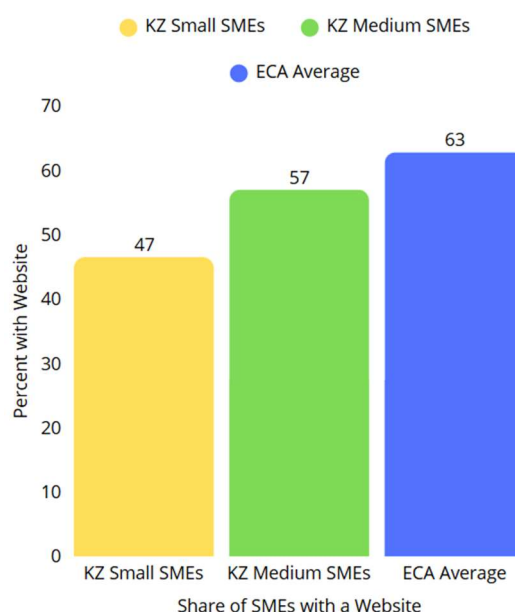


Figure 1. Share of SMEs with a website in Kazakhstan (small and medium firms) compared to the Europe & Central Asia (ECA) average. Kazakhstani SMEs lag behind the regional benchmark in basic digital presence, illustrating a gap in digital readiness. (Data: World Bank Enterprise Survey, 2019).

Figure 1 (above) underscores the digital readiness gap with a simple but telling metric. Having a website is a basic indicator of a company's digital engagement. The data show that in Kazakhstan, barely half of SMEs have cleared this basic threshold. This shortfall can be attributed to many of the internal and external factors discussed: some SMEs may not see the value (leadership/cultural issue), some may lack skills to set one up or funds to hire a professional (skills/financial issue), and others in remote areas might find it less relevant if their customer base is purely local due to connectivity issues (infrastructure/market issue).

Nonetheless, there are encouraging signs. The COVID-19 pandemic accelerated digital uptake among some SMEs, as businesses had to move online to reach customers during lockdowns. Many enterprises in retail and services launched social media pages or joined e-commerce marketplaces out of necessity. This experience has likely increased awareness of the importance of being digitally ready. Additionally, international development organizations have partnered with Kazakhstan to provide training: for instance, programs by the OECD and EU have been run to help SMEs develop e-commerce skills and digital marketing.

In the broader Eurasian context, Kazakhstan actually ranks relatively well on certain digital indicators. However, that ranking reflects overall capacity, including government and large companies. The SME sector's readiness is likely lower. Bugarova et al. (2022) emphasized that Kazakhstan's strengths lie in its strong governmental push and a young, tech-savvy population, but weaknesses such as uneven regional development and limited SME innovation activity hold it back (World Bank, 2021).

To summarize the discussion: Kazakhstan's SMEs have a foundation to build on (in terms of basic connectivity and policy intent), but they face a dual challenge. Internally, they need to invest in skills, change management, and technologies; externally, they need better supporting infrastructure and a streamlined, enabling regulatory environment. Addressing one side without the other will yield only partial success. Thus, a coordinated approach is required, involving both enterprise-level initiatives (like training and strategic planning for digital transformation within SMEs) and system-level interventions (like improving internet access, providing financial incentives, and ensuring a business-friendly digital policy framework).

Internal factors refer to capabilities and resources within the SME that affect its readiness for digital transformation. In Kazakhstan, as in many emerging economies, financial capacity is a major concern. Many SMEs operate on thin margins and have limited funds to invest in new technologies or IT infrastructure. This is reflected in low investment in innovation: only 1.5% of small businesses and 3.2% of medium businesses in Kazakhstan invest in R&D activities, far below the regional average (World Bank, 2021). Insufficient financial resources constrain SMEs from upgrading hardware, purchasing software licenses, or hiring IT talent.

Closely related is the issue of digital skills and human capital. A skilled workforce is a cornerstone of digital readiness. However, SMEs often lack employees with specialized IT or digital skills, and providing training can be costly. According to the OECD, skill shortages are among the barriers limiting SMEs' adoption of advanced digital tools in Kazakhstan (OECD, 2023). This encompasses not just technical IT skills, but also managerial skills to drive digital strategy. In many SMEs, the awareness of how digital technologies can improve business processes is limited, resulting in hesitation or inability to plan for digital adoption.

Leadership and strategic vision form another internal pillar of readiness. Studies have found that SMEs with proactive leadership tend to be more digitally ready (Alqam et al., 2024). In Kazakhstan, there is a growing recognition that beyond basic entrepreneurial skills, SME leaders need to cultivate a vision for digital transformation. Alqam et al. (2024) argue that leadership's strategic foresight and flexibility significantly influence digital outcomes. If SME owners and managers have low awareness of digital trends or perceive digitalization as non-essential, the organization's readiness level will remain low. Conversely, when top management champions digital initiatives (such as implementing e-commerce, digitizing operations, or adopting cloud services), it can accelerate readiness by aligning the organization's culture towards change.

Another internal factor is the organizational culture and agility. An SME's willingness to embrace change, experiment with new tools, and learn from failures is part of being digitally ready (Berghaus & Back, 2016; Pingali et al., 2023). Some Kazakhstani SMEs, especially younger startups, have agile cultures and are quick to try digital solutions (for example, using social media for marketing or mobile apps for sales). But many traditional SMEs may resist change due to comfort with established ways of operating. Furjan et al. (2020) describe this as the challenge of "digital or death" – companies must adapt or risk obsolescence. Building a culture that supports continuous learning and adaptation is thus a key internal challenge.

External factors are the environmental conditions, infrastructure, and policy frameworks that enable or hinder SME digital readiness. In Kazakhstan, one of the most prominent external factors is infrastructure, particularly digital connectivity. Although Kazakhstan has made progress in expanding internet access, significant gaps remain. Broadband coverage in rural areas is still limited, and the quality (speed/reliability) of internet services can be inconsistent (OECD, 2023). The OECD (2023) reports that many SMEs rely on mobile networks that have not improved in speed in recent years, leading to "persistently low uptake of digital technologies" by firms. Without fast and reliable internet, even willing SMEs cannot fully utilize cloud-based services, e-commerce platforms, or other online tools essential for digital business.

Another crucial external factor is the policy and regulatory environment. Kazakhstan's government has demonstrated support for digitalization through programs like *Digital Kazakhstan*, but certain regulatory barriers still impede SME digital adoption. For instance, complex procedures for online business registration, insufficient legal frameworks for e-commerce and data protection, or lack of standardization can discourage SMEs from going digital. The World Bank (2021) noted that Kazakhstan's telecommunications sector regulations needed modernization to foster competition and investment. A fragmented regulatory framework means that the rules governing digital business (e.g., electronic payments, cybersecurity requirements, digital signatures) might not be fully aligned with fast-evolving digital realities (OECD, 2023).

Simplifying regulations and providing clear guidelines for digital business operations are essential steps to improve external readiness conditions.

Government support and incentives also play a role. Policy support can come in forms such as grants for technology adoption, tax incentives for digital investments, or publicly funded training programs. OECD (2021) emphasizes that enabling SME digitalization often requires targeted policies to lower the barriers to technology adoption. In Kazakhstan, agencies like the “Damu” fund and other government programs have started initiatives to support SME innovation and digital projects. However, awareness of these programs may be limited among SMEs, or the programs may not be scaled sufficiently. Enhanced outreach and well-designed support schemes (for example, vouchers for obtaining digital consultancy or subsidizing software costs) could encourage more SMEs to take steps toward digitalization.

Additionally, external market pressures, such as competition and customer expectations, are drivers of digital readiness. As more consumers in Kazakhstan use digital channels (online shopping, digital payments) and as larger firms digitalize their supply chains, SMEs face pressure to keep up. Those serving corporate clients may need to integrate into digital procurement systems, while those in retail are pushed to engage customers via digital marketing and sales channels. These pressures can act as a catalyst for SMEs to build digital capabilities – but only if the other conditions (infrastructure, skills, etc.) allow them to respond.

Finally, issues of digital security and trust in the digital ecosystem affect readiness. SMEs might be reluctant to digitalize if they fear cyber threats or do not trust online systems (for payments, data storage, etc.). OECD (2023) identified digital security concerns as one of the main barriers cited by firms regarding going digital. Building cybersecurity awareness and providing accessible solutions (like cybersecurity toolkits for SMEs) are thus important external factors to boost confidence and readiness.

Combining these insights, we can summarize the key factors affecting SME digital readiness in Kazakhstan in two categories:

| Internal Factors (Within SME) | External Factors (Environment) |
|--|---|
| <i>Financial Capacity:</i> Limited budgets for IT investments; very low R&D spending by SMEs (only ~1.5% of small firms invest in R&D) (World Bank, 2021). | <i>Digital Infrastructure:</i> Gaps in broadband coverage; reliance on slower mobile internet in many regions (OECD, 2023). |
| <i>Workforce Skills:</i> Shortage of IT/digital skills; need for training employees (digital literacy programs). | <i>Regulatory Framework:</i> Outdated or complex regulations for digital business (e.g., telecom rules, e-commerce laws) (OECD, 2023). |
| <i>Leadership & Vision:</i> Management’s awareness and commitment to digital transformation; strategic foresight for adopting new tech (Alqam et al., 2024). | <i>Policy Support:</i> Government programs and incentives for digital adoption (grants, tax breaks, training initiatives) – uptake by SMEs can be improved. |
| <i>Organizational Culture:</i> Openness to change, innovation, and risk-taking; agility in processes and decision-making (Berghaus & Back, 2016). | <i>Market Pressures:</i> Customer demand for online services; competition pushing firms to innovate digitally to survive. |
| <i>Technology Base:</i> Existing ICT infrastructure within firm (hardware, software systems); integration of digital processes into operations. | <i>Cybersecurity & Trust:</i> Concerns about data security, cyber threats, and trust in digital transactions (OECD, 2023). |

Table 2. Internal and external factors influencing the digital readiness of SMEs in Kazakhstan (selected examples)

From the above, it is evident that improving digital readiness is not solely the responsibility of the SMEs themselves; it requires a conducive ecosystem. For example, an SME might have a forward-thinking leader and the willingness to digitalize, but if affordable high-speed internet is not available in its locality (external factor), its progress will be hindered. Conversely, even with great infrastructure and government support, an SME that lacks vision or skills (internal factors) may not take advantage of the opportunities.

Kazakhstan's current strategy to boost digital readiness among businesses involves addressing several of these points. The *Digital Kazakhstan* program invested in expanding broadband to rural areas and improving e-government services (which indirectly benefits SMEs by providing digital platforms) (World Bank, 2021). Ongoing efforts mentioned by OECD (2023) include reforming telecom regulations to enhance competition (thus improving service quality and lowering costs) and initiatives to raise digital literacy among entrepreneurs (OECD, 2023). The creation of tech hubs and startup incubators in cities like Almaty and Astana also contributes to an ecosystem where SMEs can access expertise and mentorship in digital innovation.

Conclusion

This study has explored the conceptual foundations of digital readiness and examined the factors affecting the digital readiness of SMEs in Kazakhstan. Through a review of literature and analysis of current data, we identified a range of internal and external factors that together determine how prepared SMEs are to embark on digital transformation. Key internal factors include financial capacity, employee skills, leadership vision, and organizational culture; key external factors include digital infrastructure, regulatory support, market conditions, and the broader innovation ecosystem.

The case of Kazakhstan shows that while policy efforts and national strategies (such as *Digital Kazakhstan*) have laid important groundwork, there remains a significant gap in SME digital readiness. Many SMEs are still in the early stages of using digital tools – for example, a large portion do not have an online presence or make only limited use of digital business solutions. This is a concern because insufficient digital readiness can limit SMEs' productivity growth and competitiveness in an increasingly digital marketplace. On the positive side, the heightened awareness of digitalization's importance (partly spurred by the pandemic and global trends) creates momentum for change.

From a conceptual standpoint, our discussion underscores that *digital readiness is multifaceted*. An SME might be very ready in one dimension (say, management mindset) but lag in another (technology infrastructure), which can hold back overall digital transformation. Therefore, assessments of digital readiness should be holistic. Policymakers and SME development programs in Kazakhstan should consider tools like tailored maturity models to diagnose specific weaknesses in SMEs (Yezhebay et al., 2021). Such diagnostics can then inform targeted interventions – for instance, if lack of skills is a common issue, expanding digital upskilling workshops and vocational IT training for SME employees would be beneficial.

Improving external factors is equally critical. Continued investment in national broadband, especially to close the urban-rural digital divide, will directly enhance SMEs' ability to participate in e-commerce and cloud-based services. Regulatory reforms, as noted by OECD (2023), should aim to simplify digital business operations and protect digital transactions, thereby increasing trust in the digital ecosystem. Moreover, creating more opportunities for SMEs to experiment with technology (through pilot programs, sandboxes, or innovation grants) can help overcome initial inertia.

For SME owners and managers, a key takeaway is the importance of proactive leadership in digital transformation. SMEs that treat digitalization as a strategic priority – setting aside budget for it, encouraging a culture of innovation, and seeking external advice or partnerships – are likely

to advance faster in digital maturity. International experience suggests that peer learning and mentorship can help; Kazakhstani SMEs might benefit from success stories and case studies of similar businesses that have undergone digital transformation.

In conclusion, the digital readiness of SMEs in Kazakhstan is a work in progress, characterized by a mix of promising developments and ongoing challenges. Enhancing this readiness is a shared responsibility. Government agencies, business associations, and educational institutions should collaborate to provide the necessary infrastructure, training, and incentives, while SMEs themselves must engage in self-assessment and capacity-building. By addressing the gaps identified in both internal capabilities and external support structures, Kazakhstan can enable its SMEs to fully leverage digital technologies – boosting their growth and contributing to the country's broader digital economy ambitions.

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