




The Impact of Managers' Knowledge on International Marketing Agility with a Focus on the Risk Management Mechanism under Conditions of Uncertainty

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ABSTRACT

The purpose of this study was to explain the impact of managers' knowledge on international marketing agility, with an emphasis on the mediating role of risk management mechanisms under conditions of environmental uncertainty. In terms of purpose, this research is applied; in terms of nature and methodology, it is a descriptive-survey study. The statistical population consisted of senior managers of information technology (IT) startups located in Pardis Technology Park that had experience in international business activities. Based on Cochran's formula, a sample of 85 participants was selected using convenience sampling. Data were collected through a standardized questionnaire, and its validity and reliability were confirmed using confirmatory factor analysis and Cronbach's alpha coefficient. Structural Equation Modeling (SEM) was employed to analyze the data and test the conceptual model using SmartPLS 3 software. The findings indicated that managers' knowledge has a significant impact on the international marketing agility of startups, both directly and indirectly through risk management mechanisms. Furthermore, risk management emerged as the strongest driving factor and played an effective mediating role in transforming managerial knowledge into agile responses under uncertain conditions. Finally, after discussing the study's limitations—including sanctions-related constraints and limited access to financial data—several recommendations were proposed to enhance market intelligence and implement agile risk management frameworks to improve startup performance.

Keywords: *Managers' Knowledge, International Marketing Agility, Risk Management, IT Startups.*

1. Introduction

The contemporary business environment is characterized by unprecedented levels of volatility, uncertainty, complexity, and ambiguity. Organizations operating in international markets face rapid technological change, shifting customer preferences, geopolitical instability, supply chain disruptions, cybersecurity threats, and increasing competitive pressures. In such an environment, traditional managerial approaches that rely on stability and predictability are becoming increasingly inadequate. Organizations must develop capabilities that enable them to respond quickly to environmental changes while maintaining strategic direction and operational effectiveness. Among these capabilities, organizational agility has emerged as one of the most critical determinants of sustainable competitive advantage and long-term success. Agility enables firms to sense environmental changes, interpret emerging opportunities and threats, and respond rapidly through adaptive decision-making and resource reconfiguration. Consequently, scholars and practitioners have increasingly emphasized the importance of integrating agile principles into organizational processes, particularly in international business contexts where environmental uncertainty is amplified (AlTaweel & Al-Hawary, 2021; Elali, 2021; Holbeche, 2023).

International marketing agility represents a specialized dimension of organizational agility that focuses on the ability of firms to rapidly adapt their marketing strategies, customer engagement practices, product positioning, and market-entry decisions across international markets. As globalization intensifies and digital technologies accelerate the pace of market change, organizations must continuously monitor international environments and adjust their marketing activities accordingly. International marketing agility allows firms to identify emerging customer needs, respond to competitive actions, capitalize on market opportunities, and manage market uncertainties more effectively. This capability is particularly important for technology-based startups that often operate under severe resource constraints while simultaneously competing in highly dynamic global markets. Startups in the information technology sector face unique challenges because technological innovation cycles are short, customer expectations evolve rapidly, and market boundaries are increasingly fluid. Therefore, the development of agile marketing capabilities has become a strategic necessity rather than a discretionary organizational competence

(AlTaweel & Al-Hawary, 2021; Elali, 2021; Holbeche, 2023).

A fundamental driver of organizational agility is the knowledge possessed by managers. Managerial knowledge encompasses the cognitive resources, expertise, professional experience, analytical capabilities, and strategic understanding that enable leaders to make informed decisions in complex environments. Managers serve as key interpreters of environmental signals and play a decisive role in shaping organizational responses to uncertainty. Their ability to acquire, process, and utilize knowledge influences how organizations recognize opportunities, anticipate risks, allocate resources, and coordinate strategic actions. In international markets, where information asymmetry and environmental complexity are often greater than in domestic contexts, managerial knowledge becomes even more critical. Knowledgeable managers are better equipped to understand market dynamics, evaluate strategic alternatives, and design adaptive responses that enhance organizational flexibility and competitiveness. Consequently, managerial knowledge has increasingly been viewed as a strategic asset capable of fostering organizational resilience and agility in turbulent environments (Holbeche, 2023; Petrovic & Chen, 2024; Pomaza-Ponomarenko, 2023).

Despite the recognized importance of managerial knowledge, organizations cannot rely solely on knowledge resources to navigate uncertainty successfully. Effective risk management mechanisms are necessary to transform managerial insights into practical actions and sustainable organizational outcomes. Risk management refers to the systematic process of identifying, assessing, monitoring, and mitigating potential threats that may affect organizational objectives. Traditionally, risk management was often viewed as a defensive function aimed at minimizing losses and ensuring compliance. However, contemporary perspectives emphasize its strategic role in supporting innovation, agility, and organizational adaptability. Effective risk management enables organizations to make informed decisions under uncertainty, allocate resources more efficiently, and balance risk-taking with opportunity exploitation. As a result, risk management has evolved from a reactive practice to a proactive strategic capability that supports organizational competitiveness and resilience (Chenya et al., 2022; Mendes et al., 2022; Nobanee et al., 2021).

Recent research has highlighted the growing importance of integrating risk management principles with agile organizational practices. Agile approaches emphasize

flexibility, iterative learning, rapid decision-making, and continuous adaptation, while risk management provides structured mechanisms for evaluating uncertainty and controlling potential negative outcomes. Rather than being contradictory, agility and risk management are increasingly viewed as complementary capabilities that reinforce one another. Organizations that successfully integrate agile methodologies with risk management frameworks can respond rapidly to change while maintaining strategic control and operational stability. This integration has attracted considerable scholarly attention across multiple domains, including project management, innovation management, software development, and organizational strategy (Petrovic & Chen, 2024; Temitope & Kareem, 2023; Zahedi et al., 2023).

The relationship between agility and risk management has been examined extensively within project and innovation management contexts. Innovative projects are inherently uncertain because they involve experimentation, technological complexity, and unpredictable market responses. Consequently, organizations implementing innovation initiatives require sophisticated risk management mechanisms that support adaptive decision-making. Research has shown that innovative risk management frameworks facilitate the identification and assessment of uncertainties while simultaneously promoting flexibility and responsiveness. By integrating risk management processes into innovation activities, organizations can improve project outcomes, reduce vulnerability to disruptions, and enhance their capacity to exploit emerging opportunities. Such findings suggest that risk management is not merely a protective mechanism but also a strategic enabler of organizational agility and innovation performance (Hrytsenko et al., 2021; Petrovic & Chen, 2024; Pomaza-Ponomarenko, 2023).

The growing adoption of agile methodologies in software development has further strengthened interest in agile risk management practices. Agile software development environments are characterized by iterative processes, frequent customer feedback, rapid technological change, and continuous adaptation. These characteristics create unique risk profiles that cannot be effectively managed using traditional risk management approaches. Consequently, researchers have proposed specialized frameworks and tools designed to integrate risk management directly into agile development processes. These frameworks emphasize continuous risk identification, collaborative decision-making, dynamic prioritization, and iterative risk

assessment. Studies have demonstrated that agile risk management practices enhance project success, improve team responsiveness, and strengthen organizational adaptability under uncertain conditions (Tavares et al., 2021; Temitope & Kareem, 2023; Zahedi et al., 2023).

The significance of agile risk management extends beyond software development to small and medium-sized enterprises and entrepreneurial ventures. Startups, in particular, operate under conditions of substantial uncertainty due to limited resources, evolving business models, and rapidly changing competitive landscapes. Effective risk management practices enable startups to identify potential threats, allocate scarce resources strategically, and maintain flexibility in response to environmental shifts. Research indicates that the utilization of agile risk management approaches contributes positively to organizational performance, resilience, and strategic adaptability among smaller firms. Such findings underscore the importance of understanding how managerial knowledge can facilitate the development and implementation of risk management mechanisms that support agile organizational behavior (Ahmed & Rashdi, 2021; Petrovic & Chen, 2024; Younus & Abumandil, 2021).

The COVID-19 pandemic provided compelling evidence of the critical role played by strategic agility and risk management in organizational survival. During periods of severe disruption, organizations that demonstrated agility were better able to adapt their operations, reconfigure resources, and maintain business continuity. Similarly, firms with effective risk management systems were more capable of anticipating challenges, mitigating adverse impacts, and sustaining performance under highly uncertain conditions. These experiences reinforced the view that agility and risk management are interconnected capabilities that jointly contribute to organizational resilience and long-term competitiveness. Moreover, they highlighted the central role of managerial knowledge in interpreting environmental changes and orchestrating effective organizational responses (Ahmed & Rashdi, 2021; AlTaweel & Al-Hawary, 2021; Elali, 2021).

Another important dimension of contemporary risk management concerns sustainability and long-term value creation. Bibliometric and systematic reviews have shown that risk management has become increasingly integrated with broader strategic objectives, including sustainability, innovation, digital transformation, and organizational resilience. Organizations are expected not only to manage operational risks but also to address strategic, technological,

environmental, and reputational uncertainties. Consequently, risk management has evolved into a multidimensional capability that influences organizational decision-making across all functional areas. This broader perspective is particularly relevant for international marketing activities, where organizations must navigate diverse regulatory environments, cultural differences, geopolitical risks, and rapidly changing customer expectations (Chenya et al., 2022; Mendes et al., 2022; Nobanee et al., 2021).

Although previous studies have separately examined managerial knowledge, organizational agility, and risk management, important theoretical and empirical gaps remain. Much of the existing literature has focused on project management, software development, innovation initiatives, or general organizational performance. Comparatively limited attention has been devoted to understanding how managerial knowledge contributes to international marketing agility through the mediating influence of risk management mechanisms, particularly within technology-based startups operating under uncertain environmental conditions. Furthermore, while research has established the importance of agility and risk management individually, less is known about the mechanisms through which managerial knowledge is translated into agile organizational responses. Addressing this gap is important because it can provide valuable insights into how organizations can strengthen their competitive position in international markets and enhance their ability to navigate uncertainty effectively (Petrovic & Chen, 2024; Pomaza-Ponomarenko, 2023; Younus & Abumandil, 2021; Zahedi et al., 2023).

Given the strategic importance of managerial knowledge, international marketing agility, and risk management in contemporary business environments, particularly for information technology startups operating in international markets, this study aims to investigate the impact of managers' knowledge on international marketing agility

with a particular focus on the mediating role of risk management mechanisms under conditions of environmental uncertainty.

2. Methods and Materials

The present study is applied in terms of its objective and descriptive-survey in terms of its nature and methodology. The statistical population consisted of senior managers of information technology (IT) startups located in Pardis Technology Park that had prior experience in international markets. Given the limited size of the population (110 individuals), Cochran's formula for finite populations was employed to determine the sample size, using a 95% confidence level and a 5% margin of error. Based on this calculation, a sample size of 85 respondents was determined. Due to accessibility considerations, a non-probability convenience sampling method was adopted.

Data were collected using a standardized questionnaire comprising 20 items measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). To conduct the analysis at the organizational level, the mean values of the responses were calculated. Subsequently, the aggregated data were entered into SmartPLS 3 software for Structural Equation Modeling (SEM). The content validity of the questionnaire was confirmed by academic experts, while construct validity was assessed through Confirmatory Factor Analysis (CFA), indicating acceptable factor loadings and model fit indices. Reliability was evaluated using Cronbach's alpha coefficient. Statistical analyses were performed using SPSS 22 and SmartPLS 3 software.

3. Findings and Results

To provide a clearer understanding of the statistical sample, the frequency distributions of demographic variables, including gender, educational level, job position, and work experience, were examined. The results are presented in Table 1.

Table 1

Frequency Distribution of Respondents' Demographic Characteristics (N = 85)

| Demographic Variable | Category | Frequency | Percentage |
|----------------------|-----------------------------------|-----------|------------|
| Gender | Male | 60 | 71% |
| | Female | 25 | 29% |
| Job Position | Project and International Manager | 50 | 59% |
| | Product Manager | 35 | 41% |

| | | | |
|-------------------------|-------------------------|----|-----|
| Education | Bachelor's Degree | 54 | 63% |
| | Master's Degree and PhD | 31 | 37% |
| Work Experience (Years) | 5–10 Years | 35 | 41% |
| | 11–20 Years | 32 | 38% |
| | More than 20 Years | 18 | 21% |

To evaluate the reliability and validity of the research instrument, Cronbach's alpha coefficient was employed. In addition, Composite Reliability (CR) and Average Variance

Extracted (AVE) were calculated. As shown in Table 2, all reliability and validity indicators met the recommended thresholds and were therefore confirmed.

Table 2

Measurement Model Assessment (Validity and Reliability Indicators)

| Research Constructs | Cronbach's Alpha | Composite Reliability (CR) | Average Variance Extracted (AVE) |
|---------------------------------|------------------|----------------------------|----------------------------------|
| Managers' Knowledge | 0.71 | 0.78 | 0.61 |
| International Marketing Agility | 0.73 | 0.81 | 0.59 |
| Risk Management | 0.74 | 0.75 | 0.63 |

Table 3 presents the Fornell–Larcker matrix used to assess discriminant validity. According to this criterion, the square root of AVE for each construct (values on the main diagonal) must be greater than its correlations with other constructs (values below the diagonal). As shown in the table, all diagonal values exceed the corresponding off-diagonal values in their respective columns. This indicates that each construct shares more variance with its own indicators than with other constructs, confirming satisfactory discriminant validity.

In the final stage, the overall model fit indices were examined. The Goodness-of-Fit (GOF) index was calculated as 0.47, which exceeds the threshold value of 0.36 and therefore indicates a very good overall model fit. Furthermore, the Standardized Root Mean Square Residual (SRMR) was obtained as 0.61. Since this value is below the recommended threshold of 0.80, the adequacy of the model fit is confirmed. Overall, the findings suggest that the model possesses satisfactory measurement and structural fit.

Table 3

Discriminant Validity Assessment Using the Fornell–Larcker Criterion

| No. | Variable | 1 | 2 | 3 |
|-----|---------------------------------|------|------|------|
| 1 | Managers' Knowledge | 0.78 | | |
| 2 | International Marketing Agility | 0.41 | 0.77 | |
| 3 | Risk Management | 0.22 | 0.29 | 0.79 |

The second set of findings focuses on testing the structural model. Following confirmation of the reliability and validity of the measurement model, the structural model was evaluated. Structural model assessment enables the examination of the proposed research hypotheses. Figures 1

and 2 present the results obtained from the SmartPLS output. According to the model, all factor loadings were statistically significant at the 95% confidence level, and all t-values fell outside the critical range of -1.96 to +1.96.

Figure 1

Structural Model in the Significance State

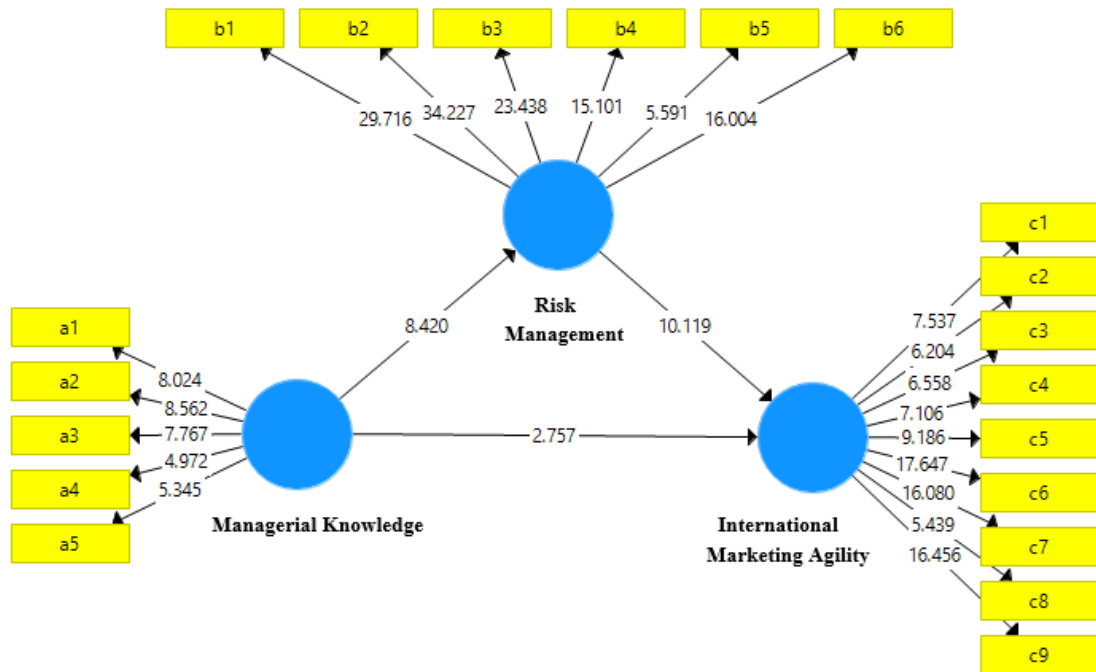
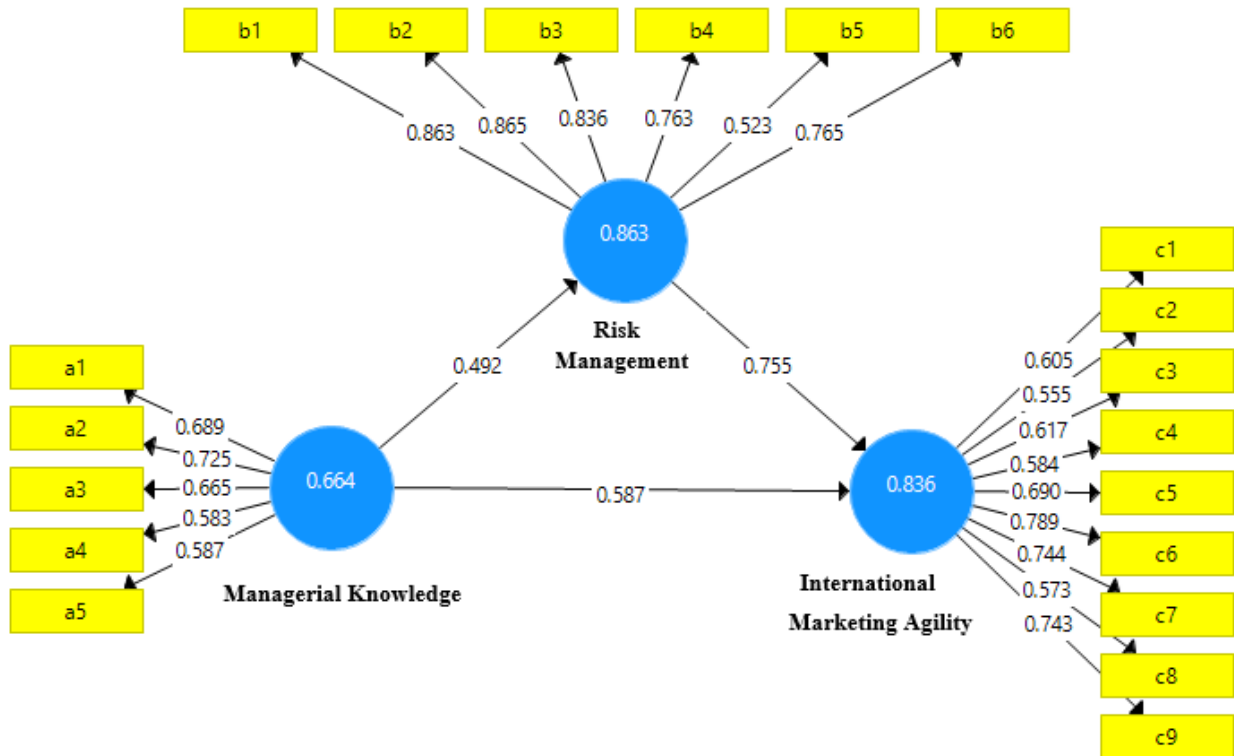


Figure 2

Structural Model in the Standardized State



To examine the causal relationships between the independent and dependent variables and to validate the

overall research model, Structural Equation Modeling based on Partial Least Squares (PLS-SEM) was employed.

Hypothesis 1: Managers' knowledge has a positive effect on international marketing agility.

H0: Managers' knowledge does not have a positive effect on international marketing agility.

H1: Managers' knowledge has a positive effect on international marketing agility.

According to Table 4, the path coefficient for the direct effect of managers' knowledge on international marketing agility was 0.587. This coefficient was statistically significant at the 95% confidence level. Since the t-statistic exceeded the critical value of 1.96, the researcher's claim that managers' knowledge positively affects international marketing agility was supported.

Hypothesis 2: Managers' knowledge has a positive effect on risk management.

H0: Managers' knowledge does not have a positive effect on risk management.

H1: Managers' knowledge has a positive effect on risk management.

As shown in Table 4, the path coefficient for the direct effect of managers' knowledge on risk management was 0.492. This effect was significant at the 95% confidence level. Since the t-value was greater than 1.96, the hypothesis was confirmed.

Hypothesis 3: Risk management has a positive effect on international marketing agility.

H0: Risk management does not have a positive effect on international marketing agility.

H1: Risk management has a positive effect on international marketing agility.

Based on Table 4, the path coefficient for the direct effect of risk management on international marketing agility was 0.755. This coefficient was significant at the 95% confidence level. Given that the t-statistic exceeded the critical threshold of 1.96, the hypothesis was supported.

Hypothesis 4: Managers' knowledge affects international marketing agility through the mediating role of risk management.

According to Table 4, the indirect (Sobel-mediated) effect of managers' knowledge on international marketing agility through risk management was 0.588. This coefficient was statistically significant at the 95% confidence level. Since the t-value exceeded the critical value of 1.96, the mediating role of risk management was confirmed, indicating that managers' knowledge positively influences international marketing agility through risk management mechanisms.

Table 4

Results of Path Coefficients and t-Values for the Structural Equation Model Hypotheses

| Research Hypotheses | Standardized Path Coefficient | t-Value | Result |
|---|-------------------------------|---------|-----------|
| H1: Managers' Knowledge → International Marketing Agility | 0.587 | 2.757 | Supported |
| H2: Managers' Knowledge → Risk Management | 0.492 | 8.420 | Supported |
| H3: Risk Management → International Marketing Agility | 0.755 | 10.119 | Supported |
| H4: Managers' Knowledge → Risk Management → International Marketing Agility | 0.588 | 6.635 | Supported |

4. Discussion and Conclusion

The present study sought to examine the impact of managers' knowledge on international marketing agility, with particular emphasis on the mediating role of risk management under conditions of environmental uncertainty. The findings revealed that managers' knowledge exerts a significant and positive effect on international marketing agility. Furthermore, managers' knowledge was found to positively influence risk management capabilities, while risk management itself demonstrated a strong positive effect on international marketing agility. Most importantly, the results

confirmed the mediating role of risk management in the relationship between managers' knowledge and international marketing agility. Collectively, these findings suggest that managerial knowledge is not only a direct strategic resource that enhances organizational responsiveness in international markets but also an indirect enabler that strengthens agility through the development of effective risk management mechanisms.

The first finding indicated that managers' knowledge positively affects international marketing agility. This result highlights the strategic importance of managerial cognitive resources, expertise, experience, and environmental awareness in enabling organizations to adapt rapidly to

international market changes. In highly dynamic global environments, managers are required to process large volumes of information, identify emerging opportunities and threats, and make timely decisions under uncertainty. Knowledgeable managers possess superior analytical and interpretive capabilities, enabling them to recognize changes in customer preferences, technological developments, and competitive dynamics more effectively than less informed decision-makers. As a result, they are better positioned to guide organizations toward adaptive marketing strategies and rapid responses to environmental changes. This finding is consistent with the broader literature emphasizing the importance of agility as a core organizational capability in uncertain environments and supports the argument that managerial competence constitutes a critical antecedent of organizational agility (AITaweel & Al-Hawary, 2021; Elali, 2021; Holbeche, 2023).

The positive relationship between managers' knowledge and international marketing agility can also be interpreted through the lens of strategic decision-making theory. Organizations competing in international markets frequently encounter information asymmetries, cultural differences, regulatory complexities, and evolving customer demands. Under such circumstances, managerial knowledge serves as a valuable resource that enhances environmental scanning, opportunity recognition, and strategic flexibility. Knowledgeable managers are more capable of anticipating market disruptions and proactively adjusting organizational strategies before competitors. This capacity contributes directly to marketing agility by enabling firms to modify products, communication strategies, distribution channels, and customer engagement practices in response to changing market conditions. Similar conclusions have been reported in studies highlighting the role of strategic agility in enhancing organizational performance and adaptability, particularly in turbulent business environments (AITaweel & Al-Hawary, 2021; Elali, 2021; Holbeche, 2023).

The second major finding demonstrated that managers' knowledge positively influences risk management capabilities. This result suggests that managerial knowledge provides the foundation upon which effective risk identification, assessment, and mitigation processes are developed. Risk management requires not only technical procedures but also cognitive capabilities that enable managers to recognize potential threats, evaluate uncertainties, and design appropriate responses. Managers with extensive knowledge and experience are more likely to understand complex risk interdependencies and anticipate

the consequences of strategic decisions. Consequently, they can establish more effective risk management systems that support organizational resilience and adaptability. This finding aligns with prior research emphasizing that risk management effectiveness depends substantially on managerial competencies and the ability to interpret environmental signals accurately (Hrytsenko et al., 2021; Mendes et al., 2022; Pomaza-Ponomarenko, 2023).

The observed relationship between managerial knowledge and risk management is particularly relevant for technology-based startups. Such organizations often operate in highly uncertain environments characterized by rapid technological change, evolving business models, and limited resource availability. Under these conditions, managerial knowledge becomes a critical mechanism for reducing uncertainty and improving decision quality. Knowledgeable managers are better able to identify strategic vulnerabilities, evaluate emerging opportunities, and balance innovation with risk control. This interpretation is supported by previous studies suggesting that successful risk management depends on continuous learning, knowledge integration, and adaptive decision-making processes (Chenya et al., 2022; Nobanee et al., 2021; Pomaza-Ponomarenko, 2023).

Another important finding was that risk management exerts a strong positive effect on international marketing agility. Among all examined relationships, this effect displayed the largest path coefficient, indicating that risk management represents a particularly influential driver of agile organizational behavior. This result supports contemporary perspectives that view risk management not merely as a defensive function but as a strategic capability that enhances organizational flexibility and responsiveness. Effective risk management enables organizations to anticipate environmental uncertainties, prepare contingency plans, allocate resources more effectively, and maintain operational continuity in turbulent conditions. As a result, organizations become more capable of implementing rapid strategic adjustments and responding proactively to market changes. This finding is consistent with studies demonstrating that organizations integrating risk management with agile practices achieve superior adaptability and performance outcomes (Petrovic & Chen, 2024; Younus & Abumandil, 2021; Zahedi et al., 2023).

The substantial influence of risk management on international marketing agility can also be explained by the increasing complexity of international business environments. Firms operating globally face numerous uncertainties, including geopolitical instability, supply chain

disruptions, regulatory changes, currency fluctuations, and cybersecurity threats. Without effective risk management systems, organizations may become overly reactive or excessively cautious, both of which can hinder agile decision-making. In contrast, organizations with mature risk management capabilities possess structured mechanisms for evaluating uncertainty and making informed decisions under pressure. Such capabilities facilitate rapid adaptation while minimizing exposure to adverse consequences. Similar arguments have been advanced in studies examining agile project management, cybersecurity risk management, and agile software development environments, where risk management has been identified as a key enabler of flexibility and resilience (Tavares et al., 2021; Temitope & Kareem, 2023; Zahedi et al., 2023).

Perhaps the most significant finding of this study concerns the mediating role of risk management in the relationship between managers' knowledge and international marketing agility. The results demonstrated that managerial knowledge enhances international marketing agility not only directly but also indirectly through the development of effective risk management mechanisms. This finding provides important theoretical insight into the process through which knowledge resources are transformed into organizational capabilities. While managerial knowledge provides the cognitive foundation for recognizing opportunities and threats, risk management serves as the operational mechanism that translates this knowledge into structured actions and adaptive responses. In other words, managerial knowledge alone may not be sufficient to generate agility unless it is supported by processes that facilitate risk assessment, uncertainty management, and strategic adaptation.

The mediating effect identified in this study supports recent theoretical arguments emphasizing the complementary relationship between agility and risk management. Rather than viewing risk management and agility as competing priorities, contemporary scholars increasingly argue that the two capabilities reinforce one another. Agile organizations require risk management systems to support informed decision-making, while effective risk management benefits from agile practices that facilitate rapid adaptation and continuous learning. The present findings provide empirical support for this perspective by demonstrating that risk management functions as a bridge connecting managerial knowledge with agile organizational outcomes. Similar conclusions have been suggested in studies examining agile methodologies,

innovation management, and organizational resilience, which emphasize the importance of integrating risk management into adaptive organizational processes (Ahmed & Rashdi, 2021; Petrovic & Chen, 2024; Pomaza-Ponomarenko, 2023).

The findings also contribute to the growing literature on agile risk management. Previous research has highlighted the value of integrating risk management into agile software development, project management, and entrepreneurial activities. However, relatively limited attention has been devoted to understanding these relationships within the context of international marketing agility among technology startups. By demonstrating that risk management mediates the effect of managerial knowledge on marketing agility, the present study extends existing knowledge and suggests that organizations seeking to improve international competitiveness should invest not only in managerial development but also in the establishment of agile risk management frameworks. Such investments can enhance organizational responsiveness while simultaneously reducing vulnerability to environmental uncertainty (Tavares et al., 2021; Younus & Abumandil, 2021; Zahedi et al., 2023).

From a practical perspective, the findings indicate that technology startups seeking to strengthen their international marketing agility should prioritize both knowledge development and risk management capability building. Managers should continuously update their knowledge regarding global market trends, technological developments, customer expectations, and emerging risks. Simultaneously, organizations should implement systematic risk management processes that support proactive decision-making and adaptive responses. The combination of knowledgeable leadership and effective risk management can create a powerful foundation for organizational resilience, innovation, and sustainable competitive advantage in international markets. This interpretation is consistent with previous research emphasizing the importance of integrating agility, innovation, and risk management within contemporary organizational systems (Ahmed & Rashdi, 2021; Holbeche, 2023; Petrovic & Chen, 2024).

Overall, the findings of this study reinforce the view that managerial knowledge, risk management, and international marketing agility are interconnected strategic capabilities. In environments characterized by uncertainty and rapid change, organizations require knowledgeable leaders who can identify opportunities and threats, robust risk management

mechanisms that support informed decision-making, and agile marketing capabilities that facilitate rapid adaptation. The present study demonstrates that these elements function as part of an integrated system in which managerial knowledge enhances risk management, risk management strengthens agility, and together they contribute to organizational effectiveness and competitiveness in international markets. These findings provide both theoretical and practical contributions to the literature on strategic agility, risk management, and international marketing in technology-based startups.

Several limitations should be acknowledged when interpreting the findings of this study. First, the research was conducted exclusively among senior managers of IT startups located in a single technology park, which may limit the generalizability of the findings to other industries, regions, or organizational contexts. Second, the study relied on self-reported questionnaire data, creating the possibility of common method bias and social desirability effects. Third, the cross-sectional design restricted the ability to establish definitive causal relationships among the variables. Fourth, environmental factors such as economic sanctions, market volatility, and restricted access to financial information may have influenced respondents' perceptions and organizational behaviors. Finally, the relatively modest sample size may limit the statistical power of the analysis and the extent to which the findings can be generalized to broader populations.

Future studies should examine the proposed model across different industries, countries, and organizational settings to enhance external validity and facilitate comparative analysis. Researchers may also employ longitudinal research designs to investigate how managerial knowledge, risk management, and marketing agility evolve over time. Additional mediating and moderating variables, such as organizational learning, digital transformation, innovation capability, entrepreneurial orientation, and market intelligence, could be incorporated into future models. Comparative studies between startups and established firms may provide valuable insights into the contextual factors influencing agile capabilities. Furthermore, qualitative and mixed-method approaches could deepen understanding of the mechanisms through which managerial knowledge is translated into agile organizational behavior under conditions of uncertainty.

Organizations seeking to improve international marketing agility should invest systematically in managerial training and knowledge development programs focused on

global market trends, strategic analysis, and uncertainty management. Startup leaders should establish formal risk management frameworks that support continuous risk identification, assessment, and response planning. Companies should also strengthen market intelligence systems to improve environmental scanning and opportunity recognition. Cross-functional collaboration between marketing, innovation, and risk management units can facilitate faster decision-making and more effective adaptation to changing market conditions. Finally, technology startups should cultivate organizational cultures that encourage learning, flexibility, proactive problem-solving, and evidence-based decision-making, thereby creating a sustainable foundation for agility and long-term competitiveness in international markets.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

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