

International Journal of Innovation Studies



THE ROLE OF RAPID INNOVATION MANAGEMENT AND STRATEGIC ALIGNMENT OF INFORMATION TECHNOLOGY IN THE BUSINESS MODEL INNOVATION PERFORMANCE UNDER CRISIS CONDITIONS IN KNOWLEDGE-BASED COMPANIES RAPID INNOVATION MANAGEMENT CAPABILITY

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Abstract

This study aimed to investigate the role of rapid innovation management and strategic alignment of information technology in the innovation performance of business models in crisis conditions in knowledge-based companies. The statistical population consisted of managers of knowledge-based companies in Tehran province. The research questionnaire was distributed and collected among 384 members of the statistical population as a sample. The information collected by the questionnaires was analyzed using SPSS24 and AMOS24 software using structural equation modeling. The results showed that rapid innovation management has a positive and significant effect on strategic alignment of information technology. Rapid innovation management has a positive and significant effect on the innovation performance of business models in crisis conditions. Strategic alignment of information technology has a positive and significant effect on the innovation performance of business models in crisis conditions. Rapid innovation management through strategic alignment of information technology has a positive and significant effect on the innovation performance of business models in crisis conditions.

Keywords: Business model innovation performance, rapid innovation management, strategic alignment of information technology.

Introduction

Global crises such as financial recession, Brexit, terrorism, natural disasters and pandemics have widespread impacts on almost every industry and affect businesses of all sizes (Tarba et al, 2019). In response to such crises, businesses have increasingly turned to business model innovation, often driven by digital transformation, as a survival strategy. Given this context, it is crucial to examine the factors that influence business model innovation performance during crises (Battisti et al, 2022). Business model innovation involves innovation in the mechanisms through which companies create, deliver and capture value, and in today's digital economy, these innovations are heavily dependent on digital technologies (Del Giudice et al., 2021). During a crisis, companies with a high level of digital literacy are able to transform into more digital entities, while companies with lower digital maturity will face liquidity problems (Priyono et al., 2020).

It is necessary to examine the factors that can ensure the successful performance of business model innovation during crises. It is argued that in times of crisis, business model innovation performance strongly depends on a company's ability to manage innovation rapidly. This argument is in line with the resource-based perspective, which assumes that value creation through resources such as digital technologies depends on a company's ability to effectively manage and organize these resources. Many examples show that companies respond to crises by innovating rapidly (Martin, 2020). The speed of business model innovation depends on the related innovation management capabilities, especially the ability to manage innovation rapidly. Building on the insights of Johnson and Murray (2021), they define rapid innovation management capability as the managerial ability to sense urgency, prioritize activities, increase collaboration, experiment, and escalate efforts in response to sudden changes in the business environment. Previous research has emphasized the need for crisis-specific management skills (Teece et al., 2016), but the specific construct of rapid innovation management capability remains underexplored. Furthermore, rapid innovation management capability is conceptually distinct from rapid innovation capability and other established constructs such as "innovation management capability" and "agility." While innovation management capability and organizational agility are established constructs, they do not fully address the unique challenges and requirements of managing rapid innovation in crisis contexts (Shamim et al., 2025).

Another key factor in the failure of business model innovation performance is the lack of strategic alignment with IT, which is essential when business model innovation is driven by digital technologies (Sjödin et al, 2022). Alignment with IT enables companies to leverage IT for their business performance by ensuring that IT strategies support business objectives. When aligned with capabilities, organizations create value from digital technologies, enhance integration, and encourage employees to adopt new strategies (Shamim et al, 2023). Crisis-driven business model innovation performance requires rapid innovation and related management capabilities, such as rapid innovation management capabilities (Johnson & Murray, 2021). Despite extensive research on strategic alignment with IT, its applications in crises remain unknown. It is argued that businesses should focus on short-term coordination to enhance business model innovation performance in times of crisis (Shamim et al, 2025).

Rapid innovation management has a positive impact on business model innovation performance in times of crisis, and this effect is mediated by strategic IT alignment. This alignment helps companies better manage technology resources and thus maintain and enhance their innovation in times of crisis. Strategic IT alignment plays a key role in optimizing digital business models, as this alignment improves resource allocation and operational efficiency of companies. In times of crisis, flexible strategies allow organizations to optimally allocate resources and effectively leverage digital technologies as conditions change rapidly. Such dynamism and adaptability will improve business model innovation performance. Rapid innovation management in knowledge-based companies increases the ability to control and apply information technology to support innovation processes, which increases the speed of response to environmental changes in crisis conditions. They acknowledged that strategic alignment of information technology strengthens the relationship between innovation management and innovation performance of business models and plays an important mediating role. Thus, knowledge-based companies can create more effective and sustainable innovations by emphasizing these two factors. The use of IT alignment strategies and rapid innovation management is recommended as a comprehensive approach to dealing with uncertainty in crisis conditions. They stated that this combination allows companies to not only increase their innovation capacity, but also to quickly identify and respond to changes, which is crucial for knowledge-based companies to maintain a competitive advantage in complex and turbulent markets.

Theoretical foundations and research background

Best practices in innovation management refer to the procedures that companies use to organize the search, selection, and implementation of the innovation process. Innovation management can be defined as creating conditions that foster human creativity, including strategic commitment and contextual management. It is a management approach that provides the organization with the fundamental driving force for innovation and encourages and facilitates the development of innovative ideas within the company (Seebode et al, 2012). To maintain effectiveness, businesses must continuously review these practices, adapt, modify, and improve them in response to changing contexts. This is especially important during a crisis, when rapid response to new conditions is essential and requires strong innovation management capabilities. Recent literature emphasizes the need for more research on digital innovation management and the importance of rapid managerial responses during crises (Johnson & Murray, 2021).

While innovation management capabilities are widely recognized, the specific structure of rapid innovation management during crises has yet to be explored. Johnson and Murray (2021) emphasize the need for management capabilities that can prioritize, collaborate, and experiment rapidly in response to sudden changes. Several studies in the existing literature report different innovation management practices, however, none of these studies suggest the key elements necessary for innovation management during crises. The existing literature considers innovation strategy; idea management; portfolio management; leadership and organizational culture; external relations; knowledge and technology management as key innovation management practices (Izadi et al, 2020.).

The rapid innovation performance of business models during crises strongly depends on the relevant innovation management capabilities, especially rapid innovation management. Innovation management capabilities are generally defined as a management approach that provides the organization with the necessary momentum for innovation by encouraging and facilitating the development of innovative ideas. Digital tools and platforms enable companies to quickly adapt to changing environments, enhance communication and collaboration, and streamline innovation processes. During the crisis, digital transformation became a critical driver of rapid innovation performance, allowing companies to respond quickly and effectively to unprecedented challenges (Li et al, 2022). The focus on digital technologies is aligned with the dynamic capabilities and resource-based perspectives, both of which emphasize the importance of using strategic resources for innovation (Burton, & Dickinger, 2025).

In a study titled Rapid Innovation Management Capability and Crisis-Based Business Model Innovation Performance: The Roles of Strategic IT Alignment and Operational IT Effectiveness, Shamim et al. (2025) propose and empirically test a new construct called Rapid Innovation Management Capability (RIAM) to examine its impact on business model innovation performance during crises. In addition, we examined the mediating role of short-term strategic IT alignment and the moderating effect of IT operational effectiveness in the relationship between rapid innovation management and crisis-based business model innovation performance. Primary survey data were collected from 139 companies across different

European sectors and structural equation modeling was used to test their hypotheses. This study contributes to the innovation management literature by developing the rapid innovation management construct and demonstrating its importance in driving business model innovation performance. Furthermore, it demonstrates how companies can use rapid innovation management to achieve short-term strategic IT alignment and, instead of relying on strategic IT alignment, Long-term, usually achieved through social and structural integration, enriches the strategic-IT alignment literature.

Panigrahi et al. (2023) in a study titled Lean Manufacturing Practices for Operational and Business Performance: A PLS-SEM Modeling Analysis empirically investigated the impact of lean manufacturing practices on operational and business performance of manufacturing firms in Oman. Empirical data on lean manufacturing practices and performance were collected using a self-administered structured survey questionnaire and the sampling frame was manufacturing firms in Oman. A total of 300 questionnaires were distributed to 185 firms and a total of 107 questionnaires were returned with a response rate of 35.6%. Statistical analysis obtained from structural equation modeling showed that lean manufacturing practices can explain operational performance, however, they cannot benefit overall business performance. Among the eight lean manufacturing practices considered, lean manufacturing and rapid start-up were found to be the most (2023) in a study titled Quality System as a Mediating Variable in the Relationship between Lean Manufacturing and Operational Performance in the Food Industry compared two methods of implementing lean manufacturing in improving operational performance, namely (1) making quality control a part of lean manufacturing and (2) converting quality control. The applied analytical method was structural equation modeling (SEM) based on partial least squares (PLS). The findings of the study showed that "making quality control a part of converting quality control" can optimally increase lean manufacturing against operational performance.

In a study titled Analysis of the Operational Performance of Information Service Companies Based on Financial Statement Indicators, Li (2023) discussed the operational performance of information service companies based on three main financial statement indicators, namely cost, payment, and operational capacity, in order to provide a basis for management when making operational decisions. In this study, financial statement data, extracted from the Taiwan Economic Journal (TEJ) database, were used for OTC companies that were listed in Taiwan since 2011. operating in the information services industry from 2010 to 2019. A total of 328 sets of reliable reference data were obtained, including 109 data sets on listed companies and 219 data sets on OTC companies. Operating performance was measured by gross profit margin. Performance management capabilities were measured by operating expense ratio, labor expense ratio, R&D expense ratio, current ratio, cash flow ratio, debt-to-equity ratio, accounts receivable, inventory, and asset turnover. Business scale was used as a control variable. According to the empirical results, the gross profit margin of an information services company was higher if the operating expense ratio, labor expense ratio, R&D expense ratio, current ratio, cash flow ratio, and accounts receivable were higher, and the debt-to-equity ratio was higher. And the fixed asset turnover was lower and the business scale was larger. In addition, the results of the principal elements regression on operating performance showed that if the performance management had better, the R&D capabilities and gross profit margin of an information services company were higher.

Liu et al. (2021) conducted a study titled The Impact of Operational Flexibility on Firm Performance during the COVID-19 Outbreak: Evidence from China to investigate the impact of firm-level operational flexibility on stock performance during the COVID-19 outbreak in China. The results showed that firm-level operational flexibility is significantly positively correlated with the cumulative abnormal stock returns that occurred during the pandemic, and this positive relationship is more pronounced in firms in provinces that are more affected by the pandemic. This positive relationship is also more pronounced in firms with relatively fewer fixed assets. Al-Karshi et al. (2020) conducted a study titled The Mediating Effect of Structural Capital on the Relationship between Strategic Innovation and the Performance of Manufacturing SMEs in Yemen. Using the structural equation modeling method in 284 (SMEs) in Yemen and examining the effect of the relationship between strategic innovation and performance with the moderating role of structural capital, they showed that there is a positive and significant relationship between strategic innovation and performance, and structural capital has increased the effect of strategic innovation on innovative performance in this type of business.

Research hypotheses

The main objective is to determine the role of rapid innovation management and strategic alignment of information technology on the innovation performance of business models in crisis conditions in knowledge-based companies. Accordingly, to achieve the aforementioned objective, the research hypotheses were designed as follows:

- -1Rapid innovation management has a significant effect on strategic alignment of information technology.
- -2Rapid innovation management has a significant effect on the innovation performance of business models in crisis conditions.
- -3Strategic alignment of information technology has a significant effect on the innovation performance of business models in crisis conditions.
- -4Rapid innovation management through strategic alignment of information technology has a significant effect on the innovation performance of business models in crisis conditions. The conceptual model of the research is as follows:

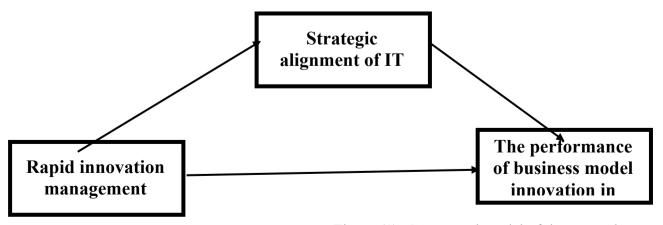


Figure (1): Conceptual model of the research

Research methodology

In terms of methodology, the present study is classified as an applied and survey study and is a correlation analysis based on structural equations. In this type of research, the relationships between variables are examined based on the research objective. In structural equation modeling, data are converted into covariance or correlation matrices and a set of regression equations between variables is formulated. Theoretical information and research literature were collected from various sources such as articles, books, websites and libraries, which is known as the library method. To analyze the hypotheses, a questionnaire was used as a survey, which is also known as the field method.

The statistical population is all managers of knowledge-based companies in Tehran province, the exact number of which is not known. In this study, to ensure equal chances for all sample members, simple random sampling method was used using Gregsey and Morgan table and the maximum sample size was 384 people. To ensure the return of questionnaires, 400 questionnaires were distributed, of which 384 questionnaires were returned completely.

The data collection tool in this study is a standard questionnaire designed based on the research of Shamim et al. (2025). This questionnaire is structured in such a way that respondents choose their options based on a five-option Likert scale from "strongly agree" to "strongly disagree". SPSS software and Cronbach's alpha coefficient were used to assess the reliability of the questionnaire. Considering that the minimum reliability coefficient for research questionnaires is 0.70, it can be seen that Cronbach's alpha coefficient for all variables was higher than this value; therefore, it can be claimed that the reliability and validity of the questionnaire are at a desirable level. The results of Cronbach's alpha coefficient are presented in Table 1.

Table 1: Questionnaire reliability results

Cronbach's alpha coefficient	Questions	Questionnaire
0.911	5-1	Rapid Innovation Management
0.851	8-6	Strategic IT Alignment
0.923	14-9	Business Model Innovation Performance in Crisis Conditions
0.981	14-1	The entire questionnaire

Research findings

The present study uses descriptive statistics and inferential statistics methods to analyze the information collected from the statistical sample. In fact, first, using SPSS software, each variable was described in the form of tables and statistical indicators, and then, to analyze the data, test the hypotheses, and in general, to generalize the results from the sample to the statistical population, the structural equation modeling method was used using Amos 24 software. Table 2 shows the results of descriptive statistics of the research variables.

Table 2: Descriptive statistics of research variables

Number	The smallest amount	The highest amount	Elongation	Skewness	Standard deviation	Average	Variable
384	5.00	1.00	0.361	-0.065	0.325	3.655	Rapid Innovation
384	5.00	1.00	-0.119	-0.324	0.612	3.335	Strategic IT Alignment
384	5.00	1.00	0.744	0.431	0.617	3.383	Business Model

Since the skewness and kurtosis of all variables are in the range of -2 and +2, all variables have a normal distribution. Therefore, parametric techniques are used to examine the research hypotheses. The conceptual model of the research was mentioned in the previous sections. Before fitting the structural model, it is necessary to examine whether the 15 items observed in the questionnaire (including the questionnaire questions) reflect the 3 dimensions or concepts (research variables) including rapid innovation management, strategic alignment of information technology, and innovation performance of business models in crisis conditions in a desirable way? The overall fit of the measurement model is determined by confirmatory factor analysis

(CFA). The next figure shows the measurement model for this study.

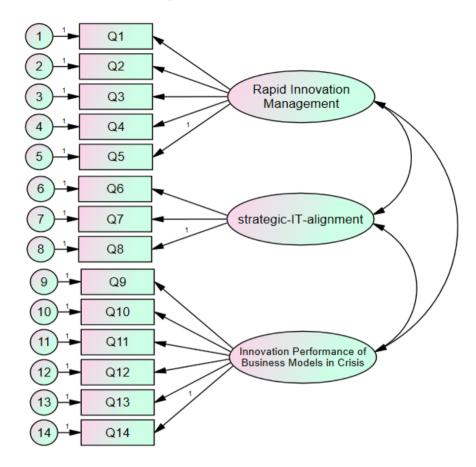


Figure 2: Factor analysis model

After running the above model, some corrections were suggested by the software, which improved the model. The corrections suggested by the software were in the form of releasing the covariance between a number of error terms. The measurement model with its corrections can be seen in the following figure.

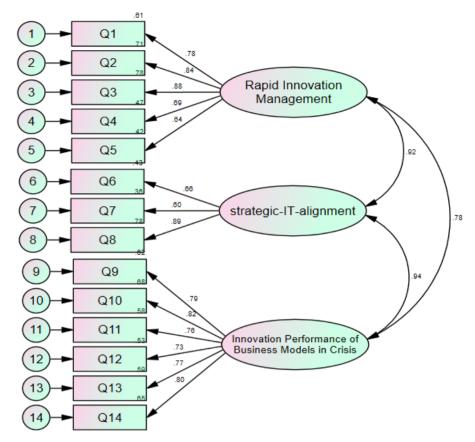


Figure 3: Factor analysis model with standardized coefficients

Before testing the hypotheses, it is necessary to ensure the validity and accuracy of the measurement models of the research variables so that structural relationships can be examined later. For this purpose, fit indices are used, which are shown in Table 3.

Table 3: Model fit indices

RMSEA	NFI	CFI	TLI	IFI	GFI	CIMIN df	Fitness Indicators
0.005	0.944	0.932	0.967	0.925	0.945	3.312	Pattern
Smaller than 0.05	More 0/9	More از 9/9	More از 9/9	More 0/9	More از 9/9	1 تا 5	Original Pattern

As can be seen in the table above, all the indices are within the desired range. Therefore, the suitability of the confirmatory factor analysis model in fitting the collected data is confirmed. In this section, the structural model of the research is fitted to examine the alignment. The analysis model of the first hypothesis is shown in Figure 3 in the standard mode.

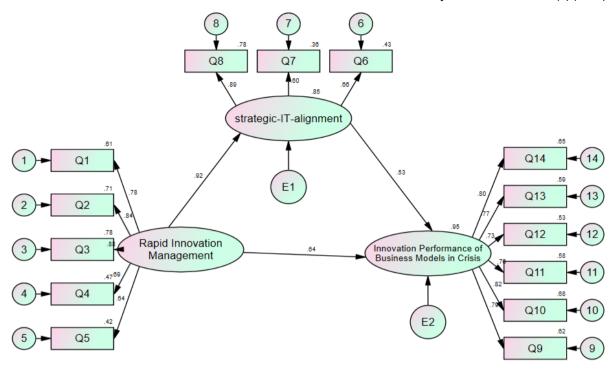


Figure 4: Structural model of the research in standard mode

←Table 4: Results of path analysis of hypotheses

p-	t-	Standard	Standardized	Path Analysis
value	statistic	deviation	coefficient	
0.000	9.648	0.092	0.924	Rapid Innovation Management → Strategic IT Alignment
0.000	4.744	0.090	0.534	Strategic IT Alignment → Business Model Innovation Performance in Crisis
0.000	8.214	0.098	0.642	Rapid Innovation Management → Business Model Innovation Performance in Crisis

Based on the results of the path analysis table, the effect of rapid innovation management on IT strategic alignment is 0.924 and the obtained significance level (0.000) is less than five hundredths. Accordingly, rapid innovation management has a positive and significant effect on IT strategic alignment. Therefore, it can be stated that at a 95 percent confidence level, the first hypothesis of the study that rapid innovation management has a significant effect on IT strategic alignment is accepted. Based on the results of the path analysis table, the effect of rapid innovation management on business model innovation performance in crisis conditions is 0.642 and the obtained significance level (0.000) is less than five hundredths. Accordingly, rapid innovation management has a positive and significant effect on business model innovation performance in crisis conditions. Therefore, it can be stated that at a 95 percent confidence level, the second hypothesis of the study that rapid innovation management has a significant effect on business model innovation performance in crisis conditions is accepted.

Based on the results of the path analysis table, the effect of strategic alignment of information technology on the innovation performance of business models in crisis conditions is equal to 0.534 and the significance level obtained (0.000) is less than five hundredths. Accordingly, strategic alignment of information technology has a positive and significant effect on the innovation performance of business models in crisis conditions. Therefore, it can be stated that at a 95% confidence level, the third hypothesis of the study that strategic alignment of information technology has a significant effect on the innovation performance of business models in crisis conditions is accepted. Based on the results of the path analysis table, the effect of rapid innovation management on strategic alignment of information technology is equal to 0.924 and the significance level (0.000) is less than 0.05. Also, the effect of strategic alignment of information technology on the innovation performance of business models in crisis conditions is equal to 0.534 and the significance level (0.000) is less than 0.05. Therefore, it can be concluded that the mediation hypothesis is accepted. Also, regarding the measurement of the indirect t value through the Sobel test, as shown in the table, the indirect t value was calculated to be 5.542, which, considering that this value is greater than 1.96, can be concluded that the mediation relationship is established. Therefore, at a 95% confidence level, the fourth hypothesis of the study that rapid innovation management through strategic alignment of information technology has a significant effect on the innovation performance of business models in crisis conditions is accepted.

Conclusion

The results obtained from this study showed that rapid innovation management as a dynamic capacity enables the organization to respond quickly to environmental changes, and this requires coordination between the information technology strategy and business goals. From the perspective of strategic alignment theory, rapid innovation requires the adaptation of technological structures to strategic frameworks in order to prevent the creation of a gap between technology and operations. Confirmation of this hypothesis suggests that organizations that manage innovation in an agile manner are automatically driven to strategic IT alignment because innovative processes require the integration of technology with business processes to accelerate decision-making and execution. This finding emphasizes the importance of integrated innovation and technology management as a prerequisite for strategic alignment. Rapid innovation management, as a resilience mechanism, enables organizations to rapidly reinvent their business models in times of crisis (such as economic downturns or supply chain disruptions). From the perspective of open innovation theory, rapid innovation in a crisis requires the absorption of external ideas and rapid collaboration with partners to create flexible business models. Confirmation of this hypothesis suggests that organizations with agile innovation processes can maintain their performance in a crisis by rapidly changing value creation (such as moving to digital or collaborative models). This finding emphasizes the role of speed as a competitive advantage in turbulent environments and shows that rapid innovation is not only a growth strategy but also a survival tool in a crisis. Strategic IT alignment, as a valuable, rare, and inimitable organizational capability, allows an organization to allocate technological resources optimally for business model innovation in a crisis. From the perspective of the strategic IT alignment model, this alignment ensures that technology investments directly support crisis-oriented innovations (such as digital transformation or rapid automation). Confirmation of this hypothesis suggests that in conditions of uncertainty,

organizations with high alignment can implement business model innovations with minimal cost and risk by integrating data, processes, and strategies. This finding emphasizes that IT in a crisis is not only a supporting tool, but also the main driver of business model innovation. The fourth hypothesis showed that rapid innovation management through strategic alignment of information technology has a significant impact on the innovation performance of business models in crisis conditions.

1. This result indicates the critical role of strategic IT alignment as a transfer mechanism. This finding is consistent with Barnes and Kenny's (1986) mediation theory and Wade and Holland's (2004) IT value chain model. Rapid innovation management alone is not sufficient; it must also lead to performance through the translation of innovative ideas into technological capabilities (alignment). This finding emphasizes the importance of integrating innovation and technology strategies and suggests that alignment is the bridge that converts the potential for rapid innovation into actual performance in a crisis. From a managerial perspective, organizations should focus on developing dual capabilities (i.e., both rapid innovation and technology alignment) simultaneously. Knowledge-based companies are suggested to create crossfunctional agile structures (joint innovation and IT teams) with integrated innovation and technology management as the core of their crisis resilience strategy so that rapid innovation management directly leads to strategic IT alignment. Design crisis adaptation frameworks that automatically align technology investments with innovative models (such as digital platforms or AI). Develop integrated performance dashboards that monitor the rapid innovation chain in real time. Promote a resilient organizational culture that integrates rapid innovation experiments with flexible IT infrastructure to implement new business models in a crisis. Implement strategic alignment tools and run crisis simulations (internet outage or sanctions scenarios) to measure the effectiveness of the chain in real-world conditions. For future research on the role of rapid innovation management and strategic IT alignment in business model innovation performance in crisis situations in knowledge-based companies, it is recommended to focus more on developing integrated frameworks that comprehensively analyze the interaction between these two key factors. Future research should examine the role of environmental and organizational variables in facilitating or hindering strategic IT alignment in unstable and crisis conditions in order to provide more effective strategies for the sustainability of business model innovation. It is also suggested that the impact of new technologies such as big data, artificial intelligence, and blockchain technologies on the management of rapid innovation and strategic alignment in a turbulent environment be studied to improve the impact of these technologies on the flexibility and responsiveness of knowledgebased companies. In addition, it is recommended that researchers pay special attention to examining the behavioral and organizational cultural dimensions related to technology adoption and rapid innovation, especially how organizational culture and transformational leadership can play a role in accelerating the process of innovation and IT alignment.

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