

Research Articles

The role of human resource development and artificial intelligent (AI) in the competitive performance within e-sports business industry

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Abstract

This study investigates the structural and operational characteristics of the e-sports industry and examines the key components of value creation for sustainable competitive advantage. The research aims to: (1) analyze the current status of the e-sports industry, (2) identify essential components that enhance value creation among e-sports business professionals, and (3) develop a structural equation model (SEM) representing value creation approaches for sustainable competition in the industry. A quantitative research design was employed using a structured questionnaire as the primary data collection instrument. The sample comprised 300 entrepreneurs and executives operating within the e-sports business sector. Data were analyzed using structural equation modeling (SEM) to test the proposed hypotheses and validate the conceptual framework.

The findings indicate that value creation in the e-sports industry is significantly influenced by four core components: effective utilization of information technology, organizational management, innovation management, and marketing orientation. These factors collectively contribute to enhancing competitive sustainability. Furthermore, comparative analysis based on business size reveals that large e-sports organizations place significantly greater emphasis

on these value creation components than small and medium-sized enterprises, with statistical significance at the 0.05 level. The study contributes to the growing body of knowledge on the e-sports industry by providing an empirically validated model of value creation. It also offers practical implications for industry stakeholders seeking to strengthen their competitive position through strategic integration of technological and managerial capabilities.

Keywords: Creating Added Value, Technology Industrial, Skills, Esports Business.

Introduction

The rapid expansion of the esports industry has transformed it into a highly competitive and technology-driven sector, requiring continuous innovation and strategic adaptation. As digital transformation continues to reshape organizational environments, success in such sectors increasingly depends on the ability to integrate emerging technologies into core operations (Chanas et al., 2019). The increasing global popularity of esports among players and audiences has intensified competition, compelling organizations to adopt innovative approaches to sustain growth and profitability. Despite this growth, there remains a need for a more comprehensive understanding of how technological innovation and workforce competencies jointly contribute to long-term competitive advantage. Existing studies often emphasize either technological advancement or skill development in isolation. For example, Chen and Wu (2024) highlight the importance of technological ecosystems and platform-based infrastructures in shaping esports participation and monetization opportunities. However, limited research integrates these dimensions into a unified framework that explains how innovation, technology adoption, and professional competencies collectively drive sustainable performance. This gap highlights the necessity of examining esports innovation from a holistic perspective.

Technology plays a central role in value creation within the esports industry, influencing player performance, organizational strategy, and fan engagement. Real-time data analytics, for example, has significantly transformed performance optimization processes. By collecting and analyzing in-game metrics such as movement patterns, reaction times, and decision-making behaviors, esports teams can refine strategies and enhance competitive outcomes (Jordan-Vallverdú et al., 2024). In games such as Counter-Strike: Global Offensive, data-driven insights enable teams to predict opponent behavior, identify tactical weaknesses, and adjust gameplay

dynamically. Furthermore, analytics are increasingly applied beyond gameplay to support monitoring of player conditions and overall performance sustainability.

In addition to analytics, Artificial Intelligence (AI) and Machine Learning (ML) are emerging as critical drivers of innovation in esports. These technologies enable advanced performance analysis, intelligent matchmaking systems, and automated detection of unfair practices. AI-driven tools also enhance fan engagement through personalized content recommendations, thereby improving user experience and platform retention (Chanias et al., 2019). Moreover, esports ecosystems increasingly incorporate interactive digital monetization mechanisms, such as virtual gifting systems during live streams, which further enhance audience participation and economic exchange within platforms (Chen & Wu, 2024). While technological advancements are essential, the development of professional competencies remains equally critical for success in esports.

The industry demands a combination of technical expertise, strategic thinking, and interpersonal skills. Technical proficiency includes mastery of game mechanics, familiarity with gaming technologies, and the ability to utilize analytical tools effectively. At the same time, strategic thinking enables players and teams to formulate and execute complex strategies in dynamic environments. Equally important are communication and teamwork skills, as esports performance relies heavily on coordination and real-time collaboration among team members. Effective communication ensures alignment in strategy execution and adaptability during gameplay (Ginting et al., 2020). Furthermore, leadership and management capabilities are essential for fostering team cohesion, maintaining motivation, and making critical decisions under pressure. These competencies extend beyond in-game performance, influencing organizational culture and long-term success.

In summary, although prior research has explored various aspects of esports development, there remains a significant gap in understanding how technological innovation and human competencies interact to sustain competitive advantage. Therefore, this study aims to examine the integrated role of innovation, technology, and skill development in shaping the future of the esports industry.

Research of Objective

1. To examine the current structure, status, and operational characteristics of the e-sports industry.
2. To identify the key components that contribute to value creation among e-sports business professionals, with a focus on technology, organizational management, innovation management, and marketing orientation.
3. To develop and validate a structural equation model (SEM) that explains the mechanisms of value creation for sustainable competitive advantage in the e-sports industry.

Literature Review

Structure, Status, and Operational Characteristics of the E-sports Industry

The e-sports industry has evolved into a structured, globally integrated digital ecosystem characterized by professional competition, media rights commercialization, sponsorship ecosystems, and platform-based content distribution. Unlike traditional sports, e-sports is inherently digital, relying on game publishers as key rights holders and ecosystem orchestrators (Scholz, 2019). Recent industry reports indicate that the global e-sports market continues to expand rapidly, driven by increased viewership, brand investment, and platform monetization strategies (Newzoo, 2024). The operational structure of the industry typically involves interconnected stakeholders, including game publishers, tournament organizers, professional teams, streaming platforms, advertisers, and fans (Jenny et al., 2017). From an organizational perspective, e-sports ecosystems are platform-centric, where value creation is distributed rather than centralized. Streaming platforms such as Twitch and YouTube Gaming function as primary distribution channels, enabling real-time engagement and monetization through advertising and subscriptions. Meanwhile, tournament organizers such as ESL and Riot Games Esports integrate competitive structures that standardize professional participation (Cunningham et al., 2018). Thus, the e-sports industry is best conceptualized as a multi-sided digital platform economy where value is co-created through interactions among technology infrastructures, content producers, and consumer communities.

Key Components of Value Creation in E-sports Business

Value creation in the e-sports industry is multidimensional, involving technological infrastructure, organizational management, innovation capability, and marketing orientation.

1. Technology as a Value Driver Technology is the foundational layer of e-sports ecosystems. High-performance computing systems, streaming technologies, cloud infrastructure, and low-latency networking enable real-time competitive gaming and global audience participation. According to Hamari and Sjöblom (2017), technological accessibility significantly influences audience engagement and participation behavior in e-sports environments.

2. Organizational Management E-sports organizations operate in highly dynamic and competitive environments requiring agile management structures. Professional teams often adopt hybrid organizational models combining traditional sports management principles with digital entrepreneurship strategies (Funk et al., 2018). Effective talent management, training systems, and governance structures are essential for sustaining competitive performance.

3. Innovation Management Innovation in e-sports is not limited to gameplay mechanics but extends to business model innovation, fan engagement strategies, and monetization systems. Scholz (2019) emphasizes that continuous innovation is necessary to sustain ecosystem relevance due to rapidly changing consumer preferences and platform dynamics. Innovation management also includes data analytics integration for performance optimization and audience targeting.

4. Marketing Orientation Marketing orientation in e-sports is strongly community-driven. Unlike traditional sports, e-sports audiences are digitally native and highly interactive. Brands engage through influencer partnerships, in-game advertising, and live-stream sponsorships. According to Cunningham et al. (2018), authenticity and community alignment are critical determinants of marketing effectiveness in e-sports environments.

Theoretical Framework

This study integrates **Resource-Based View (RBV)**, **Dynamic Capabilities Theory**, and **Service-Dominant Logic (SDL)** to explain value creation mechanisms in the e-sports industry.

Conceptual Model and Hypothesis Development (SEM Framework)

Based on the literature, this study proposes a Structural Equation Model (SEM) in which: Technology Capability (TC) Organizational Management (OM) Innovation Management (IM) and Marketing Orientation (MO)

Research Methodology

Population and samples

The research population consisted of executives and entrepreneurs from 2,500 esports and technology-driven businesses registered in Thailand in 2024 (Department of Business Development, 2024). These companies were categorized into large organizations (fixed assets over 200 million baht or over 200 employees) and small and medium businesses (assets not exceeding 200 million baht or fewer than 200 employees), following Industry Ministerial Regulations, B.E. 2545. Using Taro Yamane's (1973) formula with a 0.05 error margin, the required sample size was determined to be 345. Barnes et al. (2012) suggest that a sample size of 300 is considered good for structural equation modeling (SEM) analysis. Therefore, this study opted for a sample size of 300 participants, utilizing multi-stage sampling methods (Abraham et al., 2020), which included cluster sampling. The esports businesses were divided into two categories based on size, 150 large esports organizations and 150 small and medium-sized esports businesses. Data collection was carried out from these sample groups to analyze their technological advancements, skills, and competencies needed for sustainable competition in the esports industry.

Designing research instrument

We designed the questionnaires by studying the principles of questionnaire construction according to the conceptual research framework from books, documents, articles, and research results of various researchers, including Klarenberg et al. (2022), Verdugo et al. (2016). The research instrument was divided into three sections, as follows,

Content validity was established through a panel of 3 experts with extensive knowledge and experience in esports and technology industries. These experts evaluated the questionnaire for quality and relevance. The Index of Item–Objective Congruence (IOC) was determined to range between 0.70–1.00, which exceeded the minimum threshold of 0.50, following the criteria of Alotaibi and Alotaibi (2021), indicating that the questions accurately measured the intended objectives.

To assess reliability, the questionnaire was piloted with a sample group of 30 esports businesses similar to the target population. The Cronbach's Alpha Coefficient was calculated to be 0.95, indicating high reliability and internal consistency, which meets the standard of reliability accepted by Campo-Arias and Caballero-Dominguez (2021), (Makransky et al., 2017; Mardani et al., 2020; Marshall et al., 2013).

Statistical analysis

The data were analyzed using descriptive statistics, including frequency and percentage for checklist questionnaires, and mean and standard deviation for estimation scales. Open-ended responses were analyzed for content and summarized as frequency. A comparative analysis using t-tests was conducted to compare the business characteristics of two groups: 150 large industrial businesses and 150 small and medium businesses, with statistical significance set at 0.05. Additionally, multivariate statistics and Structural Equation Modeling (SEM) were employed using AMOS for hypothesis testing and further analysis.

Research Results

The general status of esports business organizations revealed that respondents were primarily small and medium-sized enterprises (SMEs), comparable to large businesses, with each group representing 50.00% of the sample. Most esports organizations were structured as limited companies (45.00%). The majority of these businesses had been in operation for 10 to 20 years (40.20%). Additionally, 40.60% of the business models were fully invested by Thai stakeholders, with most companies being located in provincial areas (52.50%).

The analysis of the importance level, classified by business size, found that SMEs in the esports industry emphasized approaches to creating added value through technology and the development of skills and competencies for sustainable competition. Overall, the importance level was high, with a mean score of 3.61. When considering each aspect, it was revealed that all areas were of high importance, arranged in descending order as follows, 1) Information technology had a mean of 3.77, 2) Organizational management had a mean of 3.71, 3) Innovation management had a mean of 3.70, and 4) Market orientation had a mean of 3.65.

Similarly, large esports organizations placed a strong emphasis on creating added value through technological advancements and skills development for sustainable competition, with an overall mean score of 4.09. Each aspect was of high importance, with the following descending order, 1) Information technology had a mean of 4.11, 2) Innovation management had a mean of 4.09, 3) Market orientation had a mean of 4.08, and 4) Organizational management had a mean of 4.07, as illustrated in Table 1.

This analysis demonstrates that both small and large esports organizations recognize the critical role of technology, management, innovation, and market orientation in fostering sustainable competition within the rapidly growing esports industry.

Table 1 Mean and Standard Deviation Classified by Industry Size as an Overall and by Aspect

Approaches	Small and medium industry business			Large industry business		
	$\bar{X}$	S.D.	Importance Level	$\bar{X}$	S.D.	Importance Level
Overall Importance Level	3.73	0.62	High	4.21	0.35	High
1.Information Technology	3.89	0.57	High	4.23	0.38	High
2.Organization Management	3.83	0.71	High	4.19	0.40	High
3.Innovation Management	3.82	0.58	High	4.21	0.41	High
4. Market Orientation	3.77	0.76	High	4.20	0.44	High

Approaches, approaches to creating added value of agro-industrial products for sustainable competition. The table illustrates the importance levels of various approaches to

creating added value for esports businesses, categorized by small and medium-sized industry businesses and large industry businesses. The mean and standard deviation (S.D.) are provided for each approach, along with the corresponding importance level. Overall Importance Level, for small and medium-sized businesses, the overall importance level is rated high, with a mean of 3.73 and a standard deviation of 0.62. Large industry businesses also consider this approach highly important, with a higher mean of 4.21 and a lower standard deviation of 0.35. Information Technology, in small and medium-sized businesses, information technology is considered highly important, with a mean of 3.89 and a standard deviation of 0.57. For large businesses, it is rated slightly higher, with a mean of 4.23 and a standard deviation of 0.38. Organization Management, Small and medium-sized businesses rate the importance of organizational management as high, with a mean of 3.83 and a standard deviation of 0.71. Large industry businesses also consider this highly important, with a mean of 4.19 and a standard deviation of 0.4. Innovation Management, this approach is viewed as highly important in both business categories, with small and medium-sized businesses showing a mean of 3.82 (S.D. 0.58) and large businesses a mean of 4.21 (S.D. 0.41). Market Orientation, Small and medium-sized businesses rate market orientation as highly important, with a mean of 3.77 and a standard deviation of 0.76. Large businesses give a slightly higher importance rating, with a mean of 4.2 and a standard deviation of 0.44. In summary, all approaches to creating added value are considered highly important by both small and large esports businesses, with large businesses consistently assigning slightly higher importance levels across all categories.

Table 2 Comparison of differences in importance classified by business size, the industry overall, and by aspect.

Approaches	t-value	p-value
Overall Importance Level	-9.36	0.00*
1. Information Technology	-7.07	0.00*
2. Organization Management	-10.87	0.00*
3. Innovation Management	-8.08	0.00*
4. Market Orientation	-8.05	0.00*

Approaches, approaches to creating added value of agro-industrial products for sustainable competition. *Statistically significant at 0.05 level.

The structural equation model analysis results regarding approaches to creating added value through technology and the necessary skills and competencies for esports business professionals for sustainable competition indicated that the chi-square probability (CMIN- p) was 0.161, which is greater than 0.05. This suggests that the model was statistically insignificant. Additionally, the relative chi-square (CMIN/DF) value was 1.085, which is below the threshold of 2.00, indicating a good fit. The goodness of fit index (GFI) was recorded at 0.941, exceeding the acceptable level of 0.90, while the root mean square error of approximation (RMSEA) was found to be 0.061, which is less than 0.08. These results indicate that all four statistical measures met the assessment criteria and are consistent with empirical data.

In conclusion, the analysis demonstrates that the proposed model for creating added value through technological advancements and skill development in the esports industry is valid and well-aligned with real-world data, supporting sustainable competition among esports business professionals. The results are illustrated in Figure 1.

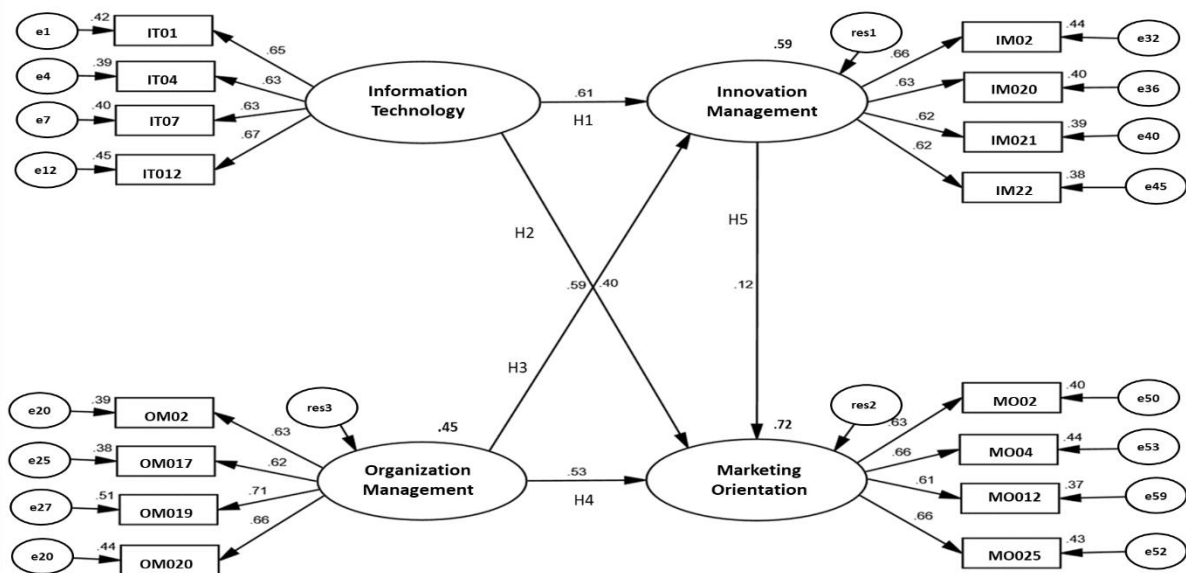


Figure 1 Structural equation model

The hypothesis testing result of 5 hypotheses to analyze the causal influence between the latent variables in the structural equation model for approaches to creating added value of agro-industrial products for sustainable competition was consistent with the set assumptions. In the context of approaches to creating added value through technology and the skills and competencies required for esports business professionals to achieve sustainable competition, the following hypotheses were tested,

H1, Information technology directly affects organizational innovation. Accept Hypothesis

H2, Information technology directly affects market orientation. Accept Hypothesis

H3, Organizational management directly affects organizational innovation. Accept Hypothesis.

H4, Organizational management directly affects market orientation. Accept Hypothesis

H5, Organizational innovation directly affects market orientation. Accept Hypothesis.

These results indicate that effective integration of information technology and strong organizational management significantly contribute to fostering innovation and enhancing market orientation within esports organizations. This, in turn, underscores the importance of these elements in creating added value and achieving sustainable competitive advantages in the rapidly evolving esports industry.

Research Discussion

The results confirm that value creation in the e-sports industry is driven by the synergistic integration of information technology, organizational management, innovation capability, and market orientation, which collectively support sustainable competitive advantage in a highly dynamic and technology-intensive environment.

Information Technology

Information technology (IT) plays a foundational role in enhancing operational efficiency and value creation within e-sports organizations. Firms prioritize secure data access

management, efficient interdepartmental data sharing, and robust backup systems to ensure operational continuity and data integrity. The transition from paper-based to digital systems further reduces operational costs and enhances workflow efficiency. These digital transformations are essential in e-sports, where real-time analytics, streaming infrastructure, and performance tracking systems are critical to organizational success. Such capabilities reflect the importance of technological resources as strategic assets that enable firms to build and sustain competitive advantage (Barney, 1991). In e-sports, IT infrastructure also supports the industry's rapid growth as a legitimate professional and entertainment sector, as highlighted by Cunningham et al. (2018), who emphasized the organizational and structural implications of e-sports development. Moreover, the rise of digital platforms has fundamentally transformed how value is created and delivered within sport and entertainment ecosystems.

Organizational Management

Organizational management is a critical determinant of sustainable value creation in the e-sports sector. Effective management systems foster a culture of innovation, collaboration, and adaptability, enabling employees to contribute to continuous improvement. Standardized and technology-enabled management processes enhance coordination, resource allocation, and strategic alignment. These capabilities are consistent with dynamic capabilities theory, which emphasizes the role of organizational processes in sensing, seizing, and transforming resources to respond to environmental change (Teece et al., 1997). In the context of e-sports, organizational structures must be highly flexible to accommodate evolving competitive formats, digital platforms, and global audiences. Furthermore, the emergence of e-sports as a formalized industry has created new managerial and educational demands, as noted by Funk et al. (2018), who highlight the need for specialized sport management education and research in this domain.

Innovation Management

Innovation is a central mechanism for maintaining competitiveness in the e-sports industry. Continuous innovation in gaming platforms, broadcasting technologies, fan engagement systems, and digital experiences enables organizations to adapt to rapidly changing consumer expectations. From a theoretical standpoint, innovation capability represents a key dynamic capability that enables firms to sustain long-term competitiveness (Teece et al., 1997). In addition, innovation in e-sports reflects broader shifts in value co-creation processes, where organizations and users jointly shape the evolution of products and experiences (Vargo & Lusch, 2004). The rapid development of e-sports as an industry also reflects its hybrid nature as both entertainment and competitive sport, requiring continuous innovation to maintain audience engagement and legitimacy (Hamari & Sjöblom, 2017). Cunningham et al. (2018) further emphasize that innovation is central to the institutionalization and professionalization of e-sports as a global industry.

Market Orientation

Market orientation is a key driver of value creation and competitive advantage in the e-sports industry. Organizations that effectively analyze consumer behavior and market trends are better positioned to develop responsive strategies and customer-centric offerings. This aligns with service-dominant logic, which emphasizes the importance of understanding value from the customer's perspective (Vargo & Lusch, 2004). In e-sports, where audiences are highly engaged and digitally connected, market orientation enables firms to tailor experiences, optimize engagement strategies, and enhance loyalty. Hamari and Sjöblom (2017) highlight that audience motivation in e-sports is strongly linked to entertainment value, social interaction, and skill appreciation, reinforcing the importance of understanding consumer behavior. Additionally, the growth of e-sports as a global market underscores the need for organizations to continuously adapt to shifting digital consumption patterns (Cunningham et al., 2018).

Integration and Theoretical Contribution (SEM Perspective)

From the perspective of the structural equation model (SEM) developed in this study, the results confirm that information technology, organizational management, innovation, and market orientation are interdependent constructs that collectively explain value creation mechanisms in the e-sports industry. The model demonstrates that these factors do not operate in isolation but rather reinforce each other in driving sustainable competitive advantage. Specifically, IT enhances organizational management efficiency; effective management facilitates innovation processes; innovation strengthens market responsiveness; and market orientation provides feedback loops that guide technological and strategic improvements. This integrated framework extends existing literature by empirically validating a multidimensional model of value creation in a rapidly evolving digital industry context.

Conclusion

This study achieved its three research objectives by systematically analyzing the e-sports industry, identifying key value creation components, and developing a structural equation model (SEM) to explain sustainable competitive advantage within the sector. First, the analysis of the current e-sports industry highlights a rapidly expanding and structurally complex ecosystem driven by digital transformation and intense market competition. Second, the study identifies four critical components of value creation among e-sports business professionals: effective utilization of information technology, organizational management, innovation management, and marketing orientation. These factors were empirically confirmed as significant determinants of sustainable competitive advantage. Third, the SEM results validate the proposed conceptual framework, demonstrating that these four components collectively and significantly influence value creation in the e-sports industry. Furthermore, comparative findings indicate that large e-sports organizations place significantly greater emphasis on these value creation components than small and medium-sized enterprises, with statistical significance at the 0.05 level. This suggests that organizational scale plays an important role in the capacity to implement strategic and technological capabilities effectively.

Overall, the significance of this research lies in its contribution of an empirically validated model that explains how value creation is structured within the e-sports industry. The findings provide both theoretical advancement in understanding digital competitive ecosystems and practical guidance for industry stakeholders seeking to enhance long-term sustainability through integrated technological and managerial strategies.

Suggestions

Recommendations for Practice and Policy

1. E-sports entrepreneurs and executives should prioritize the strategic integration of information technology as a core driver of competitiveness. Investment in advanced digital platforms, data analytics, and interactive gaming technologies can significantly enhance operational efficiency and user engagement.
2. Organizations should strengthen their organizational management structures by adopting more flexible and agile management systems. This is particularly important for small and medium-sized enterprises, which were found to place less emphasis on key value creation components compared to larger firms.
3. Innovation management should be actively promoted through continuous development of new gaming experiences, content creation, and service diversification. This will enable firms to maintain relevance in a rapidly evolving digital entertainment environment.
4. Marketing orientation is essential for sustaining market visibility and customer engagement. Stakeholders should leverage digital marketing strategies, influencer partnerships, and community-based engagement to expand their competitive reach.

Future Research Directions

Future research is recommended in several areas. First, longitudinal studies should be conducted to examine how value creation components evolve over time in response to technological disruption and market dynamics.

Second, comparative studies across different countries or regions could provide deeper insights into cultural and structural differences in e-sports industry development.

Third, future research may incorporate additional variables such as consumer behavior, digital community engagement, or regulatory influence to further refine the proposed model.

Finally, qualitative or mixed-method approaches could be employed to complement the quantitative findings and provide richer contextual understanding of strategic decision-making in the e-sports industry.

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