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Research Article

Structural Equation Modeling of Factors Influencing the Success of the Wearable Device Industry in Wenzhou

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ABSTRACT

This research investigates the key success factors (KSFs) of the wearable device industry in Wenzhou, China, by analyzing the impact of technological, market-related, and sociocultural variables on industry success. Using structural equation modeling (SEM), the study develops a framework to quantify these relationships and provides actionable insights for companies in the wearable technology sector. The research population includes stakeholders such as companies, consumers, industry experts, and government agencies. A sample size of 400 respondents was determined using the Taro Yamane formula, with stratified random sampling ensuring representation across diverse groups. Additionally, qualitative data was collected through interviews with nine small, medium, and large executive officers from three wearable device companies in Wenzhou. The findings reveal that technological, market-related, and sociocultural factors significantly influence the success of wearable devices, with statistical significance at the 0.05 level. The SEM model, KSF = 0.572SF + 0.547MF + 0.324*TF, demonstrates that sociocultural factors (SF) have the strongest impact (0.572), followed by market-related factors (MF) at 0.547 and technological factors (TF) at 0.324. This highlights the importance of aligning products and marketing strategies with Chinese consumer preferences and cultural trends. The model explains 79.40% of the variance in success, with a square multiple correlation of 0.794, confirming its reliability as a forecasting tool. The study provides a valuable framework for companies to guide strategic decision-making, allocate resources effectively, and predict success. By understanding the interconnectedness of these factors, companies can foster collaboration between departments and government agencies to drive innovation and adapt to societal changes. Ultimately, applying the insights from this SEM enables companies to enhance their competitiveness in the dynamic wearable device market through product differentiation, catering to local preferences, and building strong brand reputations. This research contributes to academic understanding and practical applications in the wearable technology industry.

Keywords: wearable devices, technological factors, innovation, stakeholders, Structural Equation Modeling

Introduction

Technological advancements since the late 20th and early 21st centuries have driven globalization, fostering interconnectedness and interdependence across the world. This progress has been a key driver of economic growth, improving incomes and living standards (Aslam et al., 2018). The rise of information technology, particularly the internet, has revolutionized communication and data exchange, with vast amounts of data transmitted globally every second (McKinsey & Company, 2016). Among the innovations spurred by this technological evolution, wearable computing has emerged as a prominent trend. Wearable devices, such as smartwatches, fitness trackers, and augmented reality glasses, are becoming integral to daily life, offering functionalities that enhance user experiences in various industries, including healthcare, manufacturing, sports, and banking (Choi et al., 2017).

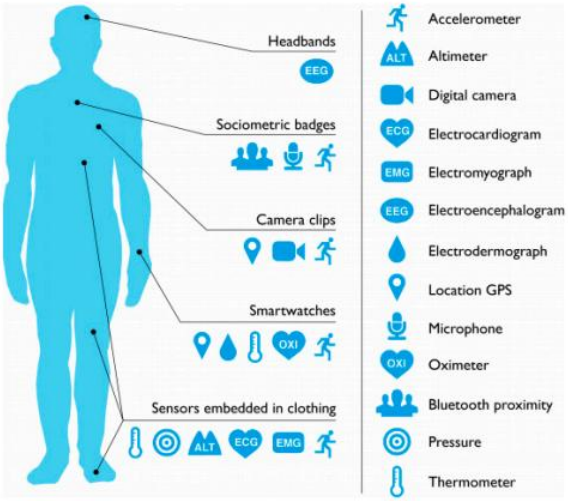
The wearable device industry has experienced significant growth since 2012, with global shipments reaching 171 million units that year (IMS Research, 2013). By 2018, annual shipments had surged to 485 million, driven by advancements that made wearable technology more seamless and integrated into everyday life (Melanson & Gorman, 2012). The market is projected to grow at a compound annual growth rate (CAGR) of 18.0%, reaching USD 265.4

billion by 2026, with a notable growth rate of 41.51% from 2021 to 2022 (MarketsandMarkets, 2021). China, a major player in the global wearable technology market, has also seen substantial growth in both volume and value. For instance, wearable device shipments in China increased from 9.4 million units in 2015 to 120.5 million units in 2020, with revenue rising from CNY 16.84 billion (USD 2.62 billion) to CNY 58.25 billion (USD 9.0 billion) during the same period (Statista, 2021).

Despite this growth, the industry faces challenges such as intense competition, data privacy concerns, regulatory compliance, and the need for cultural alignment in product design. Additionally, companies must navigate market dynamics, supply chain complexities, and sustainability practices to maintain long-term viability. This study focuses on identifying the key success factors (KSFs) of the wearable device industry in Wenzhou, China, and analyzing their interplay using Structural Equation Modeling (SEM). By understanding these factors, the research aims to provide actionable insights for companies to enhance their competitiveness and sustain growth in this dynamic market. Therefore, wearable devices become parts of our body's organs and help us to take care of our health in all activities. Figure 1 shown below is wearable devices attached to the body (Piwek, L., Ellis, D., Andrews, S., & Joinson, A., 2016).

Figure 1

Wearable devices and their attached location on the body



Literature Review

The wearable device industry has experienced significant growth globally, driven by technological advancements, evolving consumer preferences, and the increasing demand for innovative solutions in health, fitness, communication, and beyond. In China, this industry has emerged as a prominent player, leveraging its manufacturing capabilities and tech-savvy population to dominate the global market. However, the success of wearable devices in China is influenced by a complex interplay of technological, market-related, and socio-cultural factors. This literature review synthesizes existing research to provide a comprehensive understanding of these factors and their impact on the wearable device industry, particularly through the lens of Structural Equation Modeling (SEM). By examining both domestic and international studies, this review highlights the key drivers of success in the wearable device industry and identifies gaps in the current research landscape.

Technological innovation is a cornerstone of the wearable device industry's success. Studies have consistently emphasized the importance of sensor accuracy, battery life, connectivity, and user interface design in driving consumer adoption and satisfaction. For instance, research by Ajakwe et al. (2016) and Khakurel et al. (2018) highlighted how advancements in miniaturized sensors, low-power processors, and high-resolution displays have enhanced the functionality of wearable devices, making them indispensable tools for health monitoring, fitness tracking, and communication. Similarly, Canhoto (2017) found that device portability and durability are critical for sustained use, while features that enable data collection are essential for initial adoption. These findings underscore

the need for continuous innovation in wearable technology to meet consumer expectations and maintain market competitiveness. Moreover, the integration of emerging technologies such as augmented reality (AR) and the Internet of Things (IoT) has further expanded the applications of wearable devices, particularly in industries like healthcare and manufacturing. For example, AR glasses have been shown to enhance remote assistance and navigation, while IoT-enabled fitness trackers offer real-time health monitoring and data analysis. These technological advancements not only improve user experiences but also open new avenues for market growth and differentiation.

Market-related factors, including pricing strategy, brand reputation, distribution channels, and market positioning, also play a pivotal role in the success of wearable devices. Research by Afrouz and Wahl (2019) and Dunne (2019) demonstrated that consumer attitudes and perceived value significantly influence purchase intentions, with factors such as perceived usefulness, design aesthetics, and perceived behavioral control driving adoption. Additionally, studies by Parida (2020) and Krishnan and Narayanamurthy (2022) revealed that effective pricing strategies and strong brand reputation are crucial for capturing market share and ensuring long-term profitability. In the context of China, where competition in the wearable device industry is intense, companies must also navigate complex distribution networks and tailor their marketing strategies to align with local consumer preferences. For example, influencer marketing and storytelling have emerged as powerful tools for building brand loyalty and driving consumer engagement. Furthermore, the creation of a robust ecosystem of complementary software platforms, applications, and services is essential for enhancing the overall user experience. Strategic partnerships with developers and other technology providers can help wearable companies differentiate their products and create a seamless integration between hardware and software, thereby increasing consumer satisfaction and retention.

Socio-cultural factors, such as cultural preferences, social norms, and consumer attitudes, are equally important in shaping the success of wearable devices, particularly in a culturally diverse market like China. Studies by Meier (2019) and Amdan (2021) highlighted the influence of cultural alignment on wearable adoption, emphasizing the need for products to resonate with local values and lifestyles. For instance, wearable devices that incorporate traditional design elements or cater to specific health and fitness trends in China are more likely to gain consumer acceptance. Additionally, social influence and peer recommendations play a significant role in driving adoption, as evidenced by research from Bangbon et al. (2023), Kornmai (2018) and Binyamin and Hoque (2020). These studies found that social influence, perceived enjoyment, and hedonic motivation are key determinants of behavioral intention to use wearable technology. Moreover, the growing emphasis on health and wellness in Chinese society has created a favorable environment for the adoption of wearable fitness trackers and health monitoring devices. However, companies must also address concerns related to data privacy and security, as consumers become increasingly aware of the risks associated with wearable technology. Compliance with local regulations and transparent communication about data usage policies are essential for building trust and ensuring long-term success in the Chinese market.

Structural Equation Modeling (SEM) has emerged as a powerful tool for analyzing the complex relationships between technological, market-related, and socio-cultural factors in the wearable device industry. SEM allows researchers to model latent variables, assess direct and indirect effects, and evaluate the overall fit of the proposed model, providing a comprehensive understanding of the factors influencing industry success. Previous studies have successfully employed SEM to explore various aspects of wearable technology adoption, such as the impact of technological innovation on user satisfaction (Channuwong et al., 2022; Li et al., 220) and the role of market-related factors in driving market performance (Parida, 2020; Krishnan and Narayanamurthy, 2022). For example, Niknejad et al. (2019) used SEM to validate a model of behavioral intention to use smart wellness wearables, incorporating factors such as perceived trust and health improvement. Similarly, Kao et al. (2019) combined the Delphi technique and SEM to analyze the adoption of IoT-based fitness trackers, highlighting the importance of health consciousness and perceived usefulness in driving consumer behavior. These studies demonstrate the versatility of SEM in capturing the multifaceted nature of wearable technology adoption and its potential to inform strategic decision-making in the industry. However, there remains a research gap in the comprehensive application of SEM to examine the collective influence of technological, market-related, and socio-cultural factors on the success of the wearable device industry in China. This study aims to address this gap by developing a holistic SEM model that integrates these factors, offering valuable insights for companies seeking to enhance their competitiveness and sustain growth in the dynamic Chinese market.

In conclusion, the wearable device industry in China is shaped by a complex interplay of technological, market-related, and socio-cultural factors, each contributing to its success in unique ways. Technological innovation drives product functionality and user satisfaction, while effective market strategies and a strong brand reputation are essential for capturing market share and ensuring profitability. Socio-cultural factors, including cultural alignment and social influence, play a critical role in shaping consumer attitudes and adoption patterns. Structural Equation Modeling (SEM) provides a robust framework for analyzing these factors and uncovering their intricate relationships, offering valuable insights for both researchers and industry practitioners. By integrating findings from existing research, this study aims to develop a comprehensive SEM model that addresses the key success factors of the wearable device industry in Wenzhou, China, and provides actionable recommendations for companies seeking to thrive in this competitive and rapidly evolving market.

Methodology

The research methodology in this study involved a comprehensive approach to investigating the factors influencing the wearable technology industry in Wenzhou, China. The study utilized qualitative and quantitative research methods to ensure a robust and well-rounded analysis. The population consisted of stakeholders such as wearable technology companies, consumers, industry experts, government agencies, academic institutions, suppliers, and media representatives. The sample was determined using Taro Yamane's formula for a known population, resulting in a sample size of 400 respondents. The research also applied Cochran's formula when dealing with an unknown population. The study included seven independent variables and three key success factors, leading to a structured questionnaire launched across 200 respondents. The sample selection process incorporated stratified random sampling, ensuring representation from wearable technology companies, consumers across demographics, and industry experts. In addition, qualitative data were gathered through semi-structured interviews with executives from three different-sized wearable device companies, totaling nine interview participants.

The study investigated three primary categories of factors affecting the wearable technology industry: technological, market-related, and socio-cultural influences. Technological factors included sensor accuracy, battery life, connectivity, and user interface design, analyzed through Structural Equation Modeling (SEM) to determine their impact on user satisfaction. Market-related factors such as pricing strategies, brand reputation, distribution channels, and market positioning were examined through regression analysis, revealing their strong effect on industry success. Socio-cultural factors, including cultural preferences, societal norms, and consumer attitudes, were also explored using SEM to assess their impact on wearable technology adoption. The research instruments included structured questionnaires featuring Likert-scale items to evaluate technological features, market perception, and cultural influences. Additionally, the study conducted in-depth interviews and focus groups to gather qualitative insights. Data collection was executed electronically, with statistical analysis performed using PASW and AMOS software for SEM modeling. The study employed multiple goodness-of-fit indices such as Chi-square, GFI, AGFI, CFI, TLI, RMSEA, and RMR to validate the SEM model. The research findings were implemented within the wearable technology sector in Wenzhou, with industry members participating in seminars to assess the practical applications of the research model. The results contribute significantly to the academic understanding and practical implications of wearable technology industry success, aiding policymakers, businesses, and stakeholders in developing strategic frameworks for sustainable industry growth.

Research Results

This section is divided into two parts; quantitative-method results and qualitative-method results, respectively. Meanwhile, the first part consists of general information about the respondents, the results of factors influencing the success, and the analysis results and the structural equation model of the wearable device industry in Wenzhou, China.

Part 1 Quantitative results

3.1 The results of general information about the respondents: the results were collected from 400 stakeholders in the wearable device industry in Wenzhou, China. The results were about gender, age, education level, occupation, marital status, work experience, monthly income, use of wearable devices, the purpose of the wearable device used most, and information for decision-making, respectively. The results are shown in Table 1.

Table 1

General information about the respondents

General information	Number of respondents (n=400)	Percentage (%)
Gender		
Male	180	45.0
Female	220	55.0
Age		
Less than and equal to 25 years old	94	23.5
26-35 years old	178	44.5
36-45 years old	113	28.3
46-55 years old	14	3.5
More than 55 years old	1	0.2
Education level		
Less than and equal to grade 12	81	20.2
Diploma	108	27.0
Bachelor degree	154	38.5
Master degree	51	12.8
Doctorate's degree	6	1.5
Occupation		
Business owner	23	5.7
Company employee	284	71.0
Government officer	14	3.5
State enterprise employee	36	9.0
Student	43	10.8
Marital status		
Single	193	48.3
Married	202	50.5
Divorced	5	1.3
Work experience		
Less than 1 year	40	10.0
1-5 years	103	25.7
6-10 years	103	25.8
11-15 years	95	23.8
More than 20 years	42	10.5
None	17	4.3
Monthly income		
Less than and equal to RMB10,000	292	73.0
RMB10,001-15,000	63	15.7
RMB15,001-20,000	24	6.0
More than RMB20,000	21	5.3
Use of wearable devices in the present		
Have	231	57.7
Don't have	169	42.3
Purpose of wearable device used most		
Health tracking	165	41.3
Fitness tracking	65	16.3
Communication	40	10.0
GPS	37	9.3
Social media	30	7.5
Education	17	4.3
Entertainment	46	11.5

Information for making purchasing		
Websites	161	40.3
Friends	65	16.3
Family	22	5.5
Advertisement	13	3.3
Social media	78	19.5
Stores	36	9.0
User reviews	25	6.3

Table 1 showed that most respondents were females, 55.0%, having ages between 26-35 years old, 44.5%, having the education level in bachelor's degree, 38.5%, worked as company employees, 71.0%, with work experience between 1-5 years and between 6-10 years equally, 25.7%, married, 50.5%, and having average monthly income less than and equal to RMB10,000, 73.0%. Moreover, they used wearable devices, 57.7%, with the purpose of health tracking, 41.3%, and got the information for the purchasing decision by searching from websites, 40.3%, respectively.

3.2 The results of factors influencing the success of the wearable device industry in Wenzhou, China: This part showed the results of factors influencing the success of the wearable device industry in Wenzhou, China. There are 3 major independent factors, technological, market-related, socio-cultural factors, and 11 sub-factors, sensor accuracy, battery life, connectivity, user interface design, pricing strategy, brand reputation, distribution channels, market positioning, cultural preference, social norms, and consumer attitudes, respectively. The results are shown as follows:

3.2.1 Technological factors are important at a high level. Subfactors revealed that

3.2.1.1 Sensor accuracy shows that advancements in sensor accuracy can fuel innovation and enhance competitiveness in the wearable device industry and is at a high level.

3.2.1.2 Battery life is important in determining the usability and popularity of wearable devices, and it is at a very high level.

3.2.1.3 The connectivity of wearable devices can be in the form of Bluetooth, Wi-Fi, and cellular phones for usefulness and appeal, and it is at a very high level.

3.2.1.4 User interface design, such as screen size, touch sensitivity, and navigation options, in wearable devices for enhancing user experience and usability is at a high level.

3.2.2 Market-related factors are important at a high level. Subfactors revealed that

3.2.2.1 Pricing strategy with competitive pricing of wearable devices affecting market share and competitiveness within its industry is important at a very high level.

3.2.2.2 Brand reputation has a positive contribution to the overall success and market competitiveness of wearable device companies in Wenzhou, China, and is at a very high level.

3.2.2.3 Distribution channels on online retail, brick-and-mortar stores, and direct sales in reaching target consumers and increasing market penetration of wearable devices are at a high level.

3.2.2.4 Market positioning is important in differentiation, pricing, and target demographics, for wearable device companies to effectively compete in the Wenzhou market.

3.2.3 Socio-cultural factors are important at a high level. Subfactors revealed that

3.2.3.1 Cultural preference is significant in fashion trends and design aesthetics and influences consumer choices of wearable device purchasing at a high level.

3.2.3.2 Social norms are at a high level that consumers in Wenzhou to conform to social expectations for the use of wearable technology.

3.2.3.3 Consumer attitudes toward wearable devices significantly impact their acceptance and utilization at a high level.

3.2.4 Key success factors are important at a high level. Subfactors revealed that

3.2.4.1 Market preferences play a crucial role in determining the success of wearable device companies in Wenzhou at a very high level.

3.2.4.2 Consumer satisfaction is influential in building brand loyalty and repeat purchases for wearable device companies in Wenzhou.

3.2.4.3 Financial viability is important at a high level for wearable device companies to continuously innovate and invest in research and development to maintain it.

3.3 The analysis results and the structural equation model of the wearable device industry in Wenzhou, China: this is the important analysis part based on the research objective that uses the advanced statistical method, the Structural Equation Modeling. Before getting the analysis results, the researchers did this part step by step, e.g., examining the normal distribution of the data, testing the relationship between the variables, conducting the structural equation model, and modifying the optimized structural equation model, respectively.

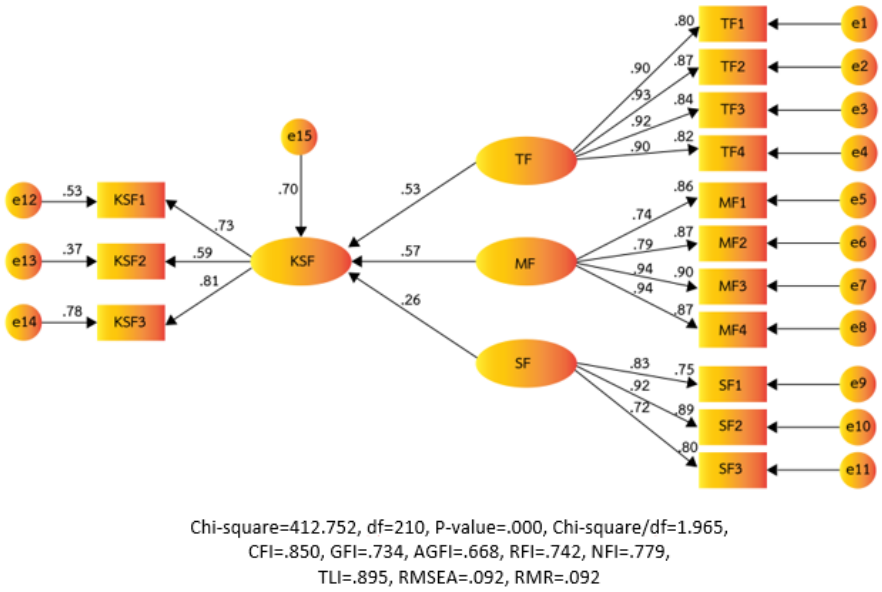
3.3.1 Examining the normal distribution of the data: This step can be called the normality test. The results of the normality test using skewness and kurtosis values indicate that all factors and their subfactors in this study follow a normal distribution. Technological factors, including sensor accuracy (TF1), battery life (TF2), connectivity (TF3), and user interface design (TF4), exhibited absolute skewness values ranging from 1.108 to 1.377 and absolute kurtosis values between .513 and 1.264, confirming normality. Market-related factors, such as pricing strategy (MF1), brand reputation (MF2), distribution channels (MF3), and market positioning (MF4), showed absolute skewness values between 1.059 and 1.300 and absolute kurtosis values from .572 to 1.312, also within the acceptable range for normality. Socio-cultural factors, including cultural preferences (SF1), social norms (SF2), and consumer attitudes (SF3), had absolute skewness values between .969 and 1.163 and absolute kurtosis values between .491 and .975, demonstrating a normal distribution. Lastly, key success factors, comprising market preference (KSF1), consumer satisfaction (KSF2), and repeat purchase behavior (KSF3), had absolute skewness values ranging from .968 to 1.252 and absolute kurtosis values between .434 and 1.149, further confirming normality. These results suggest that the data is well-suited for statistical analyses, including structural equation modeling (SEM), as the variables adhere to the assumptions of normality, ensuring reliable and valid conclusions in this research.

3.3.2 Testing the relationship between the variables: The results of the Pearson Product Moment Correlation Coefficient (r) indicate that all variables in this study exhibit correlations ranging from .602 to .793 with statistical significance at the .05 level ($P < .05$), confirming the absence of multicollinearity. This ensures the data is suitable for structural equation modeling (SEM) analysis. Specifically, technological factors show correlation values between .631 and .786, market-related factors range from .691 to .759, socio-cultural factors have correlations between .710 and .725, and key success factors range from .627 to .738, all with statistical significance at the .05 level ($P < .05$). Since all correlation coefficients are below the .800 threshold, the dataset meets the assumptions for SEM, allowing for precise and reliable model analysis. Furthermore, the normality test results confirm that all data follows a normal distribution. In conclusion, both the normality and multicollinearity tests validate the suitability of the dataset for further statistical analysis, ensuring robust and valid interpretations of the relationships among the study's key variables.

3.3.3 Conducting the structural equation model: After the data had been tested the results showed that all data had a normal distribution and non-multicollinearity. The results of the structural equation model analysis of factors influencing the success of the wearable device industry in Wenzhou are processed using the package program and shown in Figure 1.

Figure 1

Structural equation model analysis of factors influencing the success of the wearable device industry in Wenzhou



The results of the structural equation model analysis of factors influencing the success of the wearable device industry in Wenzhou were checked with the model fit index shown in Table 2.

Table 2

Model fit index of the before-modifying model

Index	Criteria	Scores	Results
χ^2/df	<3.00	1.97	Pass
CFI	≥0.95	0.85	Not pass
GFI	≥0.90	0.73	Not pass
AGFI	≥0.90	0.67	Not pass
TLI	≥0.90	0.90	Pass
RMSEA	<0.08	0.09	Not pass
RMR	<0.80	0.09	Not pass

Figure 1 and Table 2 present the model fit indices, showing χ^2 = 412.752, df = 210, P-value = .000, χ^2/df = 1.965, CFI = 0.850, GFI = 0.734, AGFI = 0.668, RFI = 0.742, NFI = 0.779, TLI = 0.895, RMSEA = 0.092, and RMR = 0.092**.** Based on standard criteria, only χ^2/df = 1.965 and TLI meet the acceptable threshold, while the remaining indices do not fit well with the empirical data. To improve the model, modification indices (MI) should be applied to adjust the standard error without altering factor relationships. Therefore, the initial model fit indices require modification for better alignment with empirical data.

3.3.4 Modifying the Optimized Structural Equation Model: the structural equation model above didn't pass the criteria of the model fit indices, so the model was modified repeatedly until the results passed the modification indices. The results of the model and its model fit index are shown in Figure 2 and Table 3 below.

Figure 2

Optimized Structural Equation Model

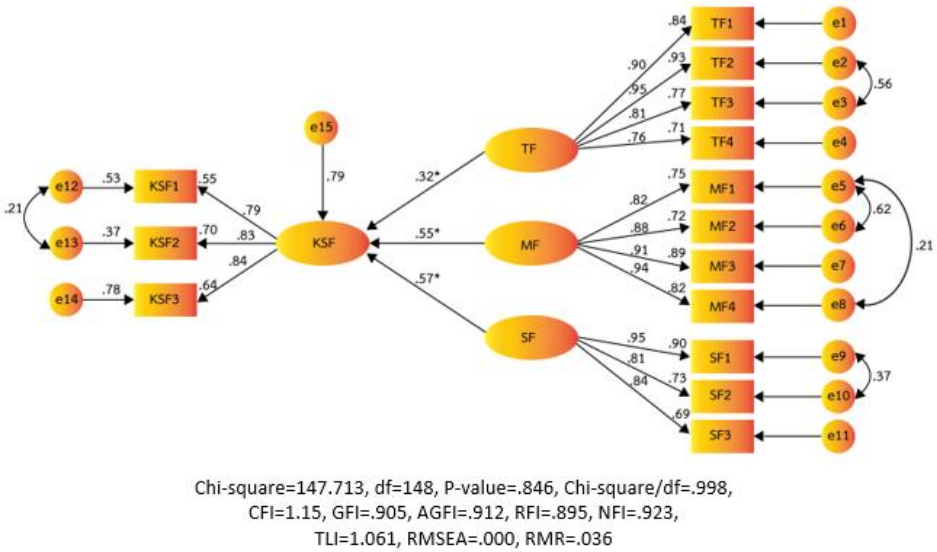


Table 3

Model fit index of the after-modifying model

Index	Criteria	Scores	Results
χ^2/df	<3.00	1.00	Pass
CFI	≥0.95	1.15	Pass
GFI	≥0.90	0.91	Pass
AGFI	≥0.90	0.91	Pass
TLI	≥0.90	1.06	Pass
RMSEA	<0.08	0.00	Pass
RMR	<0.80	0.04	Pass

The modified structural equation model has successfully adjusted a good fit with the empirical data, as shown in Table 3. The fit indices meet the standard criteria, including χ^2/df = 1.00, CFI = 1.15, GFI = 0.91, AGFI = 0.91, TLI = 1.06, RMSEA = 0.00, and RMR = 0.04, all of which pass the acceptable thresholds. A comparison of the before and after modification results in Tables 2 and 3 confirms that the model fit indices significantly improved after modification, transitioning from not harmonized to harmonized with empirical data. This improvement validates the structural model for further analysis. Additionally, the component fit and factor loadings (λ) were examined for each factor. Technological factors (TF), including sensor accuracy, battery life, connectivity, and user interface design, have factor loadings ranging between 0.761 and 0.953, with squared multiple correlations between 71.2% and 92.8%, indicating strong relationships. Market-related factors (MF), such as pricing strategy, brand reputation, distribution channels, and market positioning, show factor loadings between 0.824 and 0.942 and squared multiple correlations between 72.4% and 89.2%, confirming their relevance. Socio-cultural factors (SF), including cultural preference, social norms, and consumer attitudes, have factor loadings from 0.807 to 0.951, with squared multiple correlations between 69.2% and 89.9%. Lastly, key success factors (KSF), measured by market preference, consumer satisfaction, and financial viability, exhibit factor loadings from 0.792 to 0.844, with squared multiple correlations ranging from 55.4% to 70.1%. These results demonstrate the robustness of the model and its strong theoretical alignment with the study's conceptual framework.

Furthermore, the validity analysis of the structural equation model (SEM) for factors influencing the success of the wearable device industry in Wenzhou confirms its robustness. The composite reliability (ρc) values range between 0.901 and 0.945, exceeding the acceptable threshold of 0.60, while the average variance extracted (ρv) values range between 0.736 and 0.872, surpassing the 0.50 standard, ensuring construct validity. The causal relationships

among variables indicate that each independent factor—technological factors (TF), market-related factors (MF), and socio-cultural factors (SF)—positively influences the key success factors (KSF). The direct effect values of TF (0.324), MF (0.547), and SF (0.572) suggest that socio-cultural factors have the strongest influence, followed by market-related factors, while technological factors contribute the least. The model's forecasting performance, measured by the square multiple correlation (R^2), is 0.794 or 79.40%, meaning that TF, MF, and SF explain 79.40% of the variance in KSF, confirming its strong predictive capability. This aligns with Hair et al. (1998), who suggested that R^2 values above 0.70 indicate high model validity in social sciences. The SEM equation, KSF = 0.324*TF + 0.547*MF + 0.572*SF; R^2 = 0.794, confirms that higher performance in each factor leads to better overall success in the wearable device industry.

Part 2 Qualitative results

The insights gathered from six CEOs and senior executives of leading wearable device companies in Wenzhou, China, highlight critical factors contributing to industry success. Technological innovation, market dynamics, and socio-cultural influences emerged as key drivers shaping the sector. The general manager of China Smart Valley emphasized the growing consumer preference for health-tracking and fitness-monitoring devices, aligning with China's broader smart city initiatives. He emphasized that wearable devices must integrate real-time health monitoring, AI-powered sensors, and healthcare connectivity to support an aging society and growing wellness trends. Similarly, the Huawei Technologies general manager stressed technological advancements, particularly enhanced battery life, AI integration, and seamless connectivity, to enable smart home ecosystems. This aligns with Apple Shop's sales manager, who focused on market positioning, competitive pricing, and distribution channels, ensuring that premium brands optimize supply chains to expand into tier-2 and tier-3 cities. Meanwhile, the Honor: Magic brand sales manager highlighted the role of fashion and luxury branding, positioning wearables as fashion accessories rather than just functional devices. The Redmi marketing manager underscored the necessity of integrating wearable healthcare applications into medical monitoring, recommending collaborations with healthcare providers to assist aging populations and those with chronic illnesses. Lastly, the IFLYTEK general manager emphasized IoT integration and smart ecosystem compatibility, stressing the importance of government-private partnerships in research and development to align with smart city policies and improve local market adaptability.

The recommendations from industry leaders highlight strategies for ensuring success in the wearable device sector. Companies must prioritize consumer health and lifestyle, developing advanced wellness features to align with China's health-conscious market. Continuous technological innovation is vital, with a focus on superior battery performance, seamless IoT connectivity, and AI-driven functionalities. Firms should optimize market strategies by offering competitive pricing, wide distribution, and consumer education on wearable technology benefits. Additionally, brands must align with socio-cultural trends, catering to fashion-conscious consumers with luxury design and personalization options. Localization is crucial, requiring businesses to tailor products and marketing strategies to Chinese consumer preferences to build long-term brand loyalty. By aligning industry strategies with these key factors, wearable device companies in Wenzhou, China, can enhance their market competitiveness, drive innovation, and establish a strong global presence in the expanding wearable technology sector. The results including the recommendations are concluded in Table 4.

Table 4

Results of In-depth Interview

Interviewee	Company	Key Factors for Success	Recommendations
General Manager	**China Smart Valley and Technology City**	Socio-cultural factors: consumer demand for health tracking and fitness monitoring; integration with healthcare systems; alignment with smart city initiatives	**Continuous innovation in sensors and AI for real-time health tracking**
General Manager & Assistant	**Huawei Technologies**	Technological innovation: advanced sensors, improved	**Integration with smart home and smart city ecosystems**

		battery life, seamless connectivity, R&D investment	
Manager & Assistants	**Apple Shop**	Market-related factors: competitive pricing, distribution channels, brand image, market positioning, product awareness	**Optimize supply chain and distribution for competitive pricing and wider reach**
Sales Department Manager	**Honor: Magic brand**	Socio-cultural factors: adapting to fashion trends and luxury branding; product differentiation through design and customization	**Align wearable products with luxury and fashion trends**
Marketing Manager	**Redmi**	Technology and socio-cultural factors: smart applications for healthcare; addressing real health concerns; partnerships with healthcare providers	**Develop wearable devices with healthcare applications for medical monitoring**
General Manager	**IFLYTEK**	Technology and socio-cultural factors: integration with IoT ecosystems; interoperability with smart systems; localization and cultural relevance; collaboration between private and government sectors	**Balance localization and cultural relevance; foster collaboration for R&D and innovation**

The application of the SEM and Qualitative Model for Using Wearable Technology in Daily Life

The Structural Equation Model (SEM) equation, KSF = 0.324*TF* + *0.547*MF + 0.572*SF; R^2 = 0.794, confirms that higher performance in technological factors (TF), market-related factors (MF), and sociocultural factors (SF) leads to better overall success in the wearable device industry. This equation demonstrates that socio-cultural factors (SF) have the strongest impact (0.572), followed by market-related factors (0.547) and technological factors (0.324). This finding shows that what people like, social trends and a focus on health are key factors in the popularity of wearable technology, backed by smart marketing and ongoing tech improvements. In daily life, wearable devices can be applied in various ways, such as smartwatches for health monitoring, smart rings for biometric authentication, AI-powered fitness trackers, and wearable IoT-connected clothing for enhanced convenience and security. For instance, a person managing a chronic illness can benefit from real-time heart rate monitoring and blood oxygen tracking using a smartwatch, enabling better medical intervention and preventive care. Smart glasses with AI-driven language translation are another example, of enhancing communication for international travelers or business professionals. Wearable payment devices, such as smart rings or wristbands, integrate financial transactions seamlessly into daily life, increasing convenience and security in cashless societies. These applications support the SEM equation, which shows that better performance in important areas greatly improves how useful and successful wearable technology is in everyday life.

The qualitative findings from industry executives further validate the SEM results, emphasizing the real-world integration of wearable devices into different aspects of daily life. The general manager of China Smart Valley highlighted smart city initiatives, where wearables such as smart health trackers and AI-powered sensors improve personal well-being while integrating with hospital databases for seamless healthcare monitoring. The Huawei Technologies executive stressed the importance of battery life, AI connectivity, and smart home integration which is evident in wearable sleep monitors that control room lighting and temperature for better sleep quality. The Apple Shop sales manager pointed out market-related strategies, reinforcing the importance of brand positioning and consumer accessibility, demonstrated in tier-2 and tier-3 cities where wearables are gaining traction for work productivity and fitness tracking. The Honor: Magic sales manager focused on fashion and luxury branding which can be seen in wearables like designer smartwatches or limited-edition AI-driven fashion accessories. The Redmi marketing manager emphasized healthcare applications, supporting wearables that offer fall detection and

emergency alerts for elderly users. Lastly, the IFLYTEK general manager emphasized IoT integration, aligning with wearable home automation systems, where smart bands connect to home security systems and personal AI assistants. These applications demonstrate how the wearable industry aligns with SEM-driven success factors, making wearable technology an integral part of daily life. By leveraging technological advancements, adapting to market demands, and incorporating socio-cultural preferences, wearable devices will continue to shape modern lifestyles, enhance well-being, and redefine the interaction between humans and technology.

Conclusion and Recommendations

5.1 Conclusion

The research findings indicate that socio-cultural factors, including consumer preferences, lifestyle choices, and health consciousness, have the strongest influence on industry success. This supports earlier studies by Niknejad et al. (2019), Rabaai & Zhu (2021), Sagmanli (2022), and El-Masri et al. (2022), which emphasize the need to adjust wearable devices to fit different cultures and behaviors. The study confirms that wearable companies must focus on personalizing designs, incorporating health-monitoring features, and aligning marketing strategies with social trends to enhance consumer engagement and brand loyalty. The structural equation model is a useful tool for helping wearable device companies in Wenzhou succeed. It offers a way to balance new technology, market strategy, and adapting to local culture. The model shows a strong ability to explain results, indicating that companies can improve their market performance by focusing on innovation, smart branding, and designs that attract consumers. Improving how the stakeholders manage the supply chain, working closely with healthcare providers, and using AI health applications can help you stand out and enter the market better. Public-private partnerships play a crucial role in fostering innovation, aligning industry goals with government smart city initiatives, and ensuring long-term sustainability in the competitive global market. The research suggests that companies that leverage technological advancements in AI and IoT, enhance market accessibility, and integrate cultural preferences into product development will strengthen their market position. This study provides valuable insights for investors, policymakers, and businesses, supporting the adoption of wearable technology in both domestic and international markets. Future research can explore how to adjust the model for different regions. It should consider new trends in what people want and changes in the industry to improve strategies for using wearable technology.

5.2 Recommendations

5.2.1 Recommendations for applying the model to stakeholders: Stakeholders should align wearable devices with consumer health monitoring, fashion, and lifestyle preferences to enhance market adoption and satisfaction. They should consistently track emerging trends in health, fitness, and fashion to adapt their products and marketing strategies effectively. Prioritizing R&D is crucial to improving technological features like battery life, sensors, and IoT integration, ensuring devices remain competitive. Additionally, companies should refine market strategies by offering competitive pricing, expanding distribution channels, and educating consumers about the benefits of wearable technology. These efforts will strengthen market positioning and drive long-term success in the wearable device industry.

5.2.2 Recommendations for further study: Future research could explore regional variations in consumer preferences and social factors across China, extending beyond Wenzhou for broader insights. Studies should also investigate the impact of emerging technologies like AI, 5G, and augmented reality on wearable device success. Additionally, examining the long-term sustainability of wearables, including environmental impacts, product lifecycle, and recycling potential, is essential. Using structural equation modeling, further research could analyze the relationship between consumer satisfaction, loyalty, and repeat purchases. Finally, academics should explore the intersection of technology, consumer behavior, and market dynamics in the wearable device industry across different regions and contexts.

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