VARIABLE SELECTION IN STRUCTURAL EQUATION MODELLING OF FACTORS INFLUENCING T HE SUCCESS OF THE WEARABLE DEVICE INDUSTRY IN WENZHOU, CHINA

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Abstract

The research on "Variable Selection in Structural Equation Modeling of Factors Influencing the Success of the Wearable Device Industry in Wenzhou, China" aimed to 1) study the variables (factors) of the wearable device industry in Wenzhou, China, and 2) identify and select the most significant factors influencing the success of the wearable device industry in Wenzhou, China. The research methodology was variable selection methods in Structural Equation Modeling (SEM), including the focus group and grounded theory. The study results found that the rapid evolution of China's wearable technology industry, driven by advancements, manufacturing expertise, and consumer demand, has made it a global key player. Variables selected from the study that affect the success of the wearable device industry are categorized into 3 major variables and their sub-variables are (1) technological; sensor accuracy, battery life, connectivity, and user interface design, (2) market-related; pricing strategy, brand reputation, distribution channels, and (3) socio-cultural; cultural preferences, social norms, social attitudes. Since the socio-cultural factor reflects significantly on consumer behaviors through technology. Key indicators of success as the dependent factor include market preference, consumer satisfaction, and financial viability, emphasizing the importance of innovation and culturally appropriate designs. The variable selection method used in this study is helpful and useful for academic purposes when proceeding with structural equation modeling research.

Keywords: Cultural Preferences; Social Norms, Attitudes; Wearable Devices

Introduction

Globalization and technological advancements have increased global connectivity since the late 20th century, fostering more trade, investment, and communication across nations. Technological progress has improved incomes and living standards, with the Internet enabling massive data transmission across borders (Aslam et al., 2018; McKinsey & Company, 2016). Rapid innovation, driven by consumer demand and decreasing costs, led to wearable computing, encompassing devices worn on the body or integrated into the environment (Office of the Privacy Commissioner of Canada, 2014). The wearable device market grew from 171 million units in 2012 to 485 million by 2018, with projections reaching USD 265.4 billion by 2026 (IMS Research, 2013; Melanson & Gorman, 2012; Choi et al., 2017; Market sand Markets, 2021). Data on wearable unit shipments in China from 2014 to 2020 shows significant growth in the industry. In 2015, 9.4 million units were shipped, generating 16.84 billion CNY (2.62 billion USD). By 2020, shipments reached 120.5 million units, with revenue of 58.25 billion CNY (9.0 billion USD). The wearable device industry, encompassing products such as smartwatches, fitness trackers, and augmented reality devices, has shown remarkable growth potential in recent years (Yasar, K., 2023). The world market volumes of wearable devices separated into specific items are shown in Figure 1 global wearable technology market, including the forecasting in the years 2024-2032.

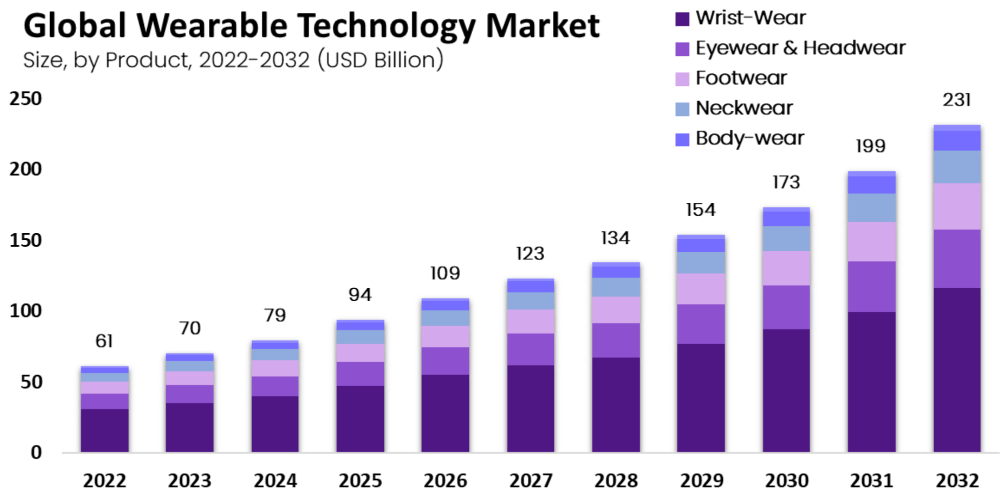

Figure 1: Global wearable technology market in the years 2022-2032 (Pharmiweb, 2024)

The wearable device industry in China, featuring products like smartwatches and fitness trackers, is rapidly expanding due to technological advancements, health awareness, and a tech-savvy population. However, this growth has heightened competition and presented challenges in innovation, data privacy, and regulatory compliance. Success hinges on developing user-friendly technologies and creating ecosystems of compatible applications and services. Cultural perceptions, efficient production, market segmentation, and sustainability are crucial factors. Economic fluctuations also affect consumer purchasing power and industry growth. In China, particularly in Wenzhou, this industry is experiencing rapid expansion driven by technological advancements and increasing consumer demand. However, this growth has intensified competition among companies vying for market share and profitability. Understanding the key factors influencing the success of this industry is crucial for stakeholders to navigate these challenges and capitalize on opportunities. (Wu, X. & Wu, D., 2023) This research uses Structural Equation Modeling (SEM) to analyze the complex factors influencing the industry's success, aiming to offer strategic insights for sustained growth. This trend highlights the industry's expansion and economic impact. The researchers focus on factors influencing the success of the wearable device industry. Therefore, the researchers concentrate on the variable selection techniques to proceed with the full pattern of the structural equation modeling of the most significant factors influencing the success of the wearable device industry in Wenzhou.

Research objectives

1. To study the factors of the wearable device industry in Wenzhou.

2. To identify and select the most significant factors influencing the success of the wearable device industry in Wenzhou.

Literature Reviews

Wearable device technology and its industry: Wearable technology is still in its infancy, encompassing devices and systems that can be worn to perform daily tasks. This includes smart devices and portable gadgets that communicate wirelessly and are integrated into clothing or accessories. These wearables, ranging from wristbands to smartwatches, contain sensors to process health data for the user. They gather information, monitor activities, and personalize experiences based on collected data. Wearables are prevalent in various industries like agriculture, sports, and healthcare, equipped with sensors, network connections, data processors, and cameras for enhanced functionality (Luczak, T. et al., 2020, Sharma, A. et al., 2022). The wearable devices mostly work under the sensor controls and there are many types of them as shown in Figure 1.

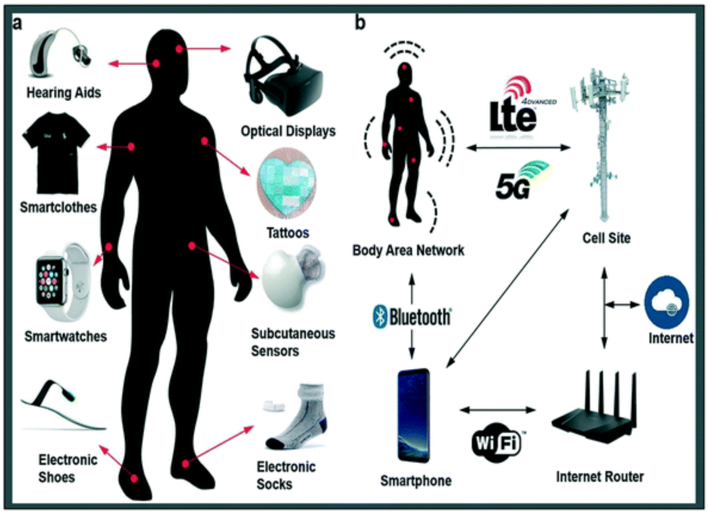

Figure 2: Wearable devices and their works (Yetisen, A.K. et al., 2018)

According to Figure 1, wearable electronics are either in close contact with the skin, worn loosely, or inserted into bodily openings as shown in section (a). The predominant interface is through devices that capture electrophysiological signals using optics and electrodes. Data transmission from wearables involves various connectivity options such as Body Area Networks (BAN), Bluetooth, WiFi, LTE, 3G, 4G, and 5G to transfer information to the internet as shown in section (b). This data can be accessed by healthcare professionals for medical feedback or utilized by other networked devices (Yetisen, A.K. et al., 2018). Furthermore, there are five major types of wearable devices based on their sensor technology which are skin-based wearable devices, wearable mechanical sensors, wearable electrical sensors, wearable optical sensors, and wearable chemical sensors (Sharma, A. et al., 2022).

Wearable devices have gained widespread popularity due to their practical attachment to the human body. The competitive landscape in the wearable device industry is marked by companies striving for market leadership through innovation. Manufacturers continually introduce cutting-edge gadgets that are both efficient and user-friendly, including fitness trackers, smartwatches, and AR glasses to meet diverse consumer demands. Wearable technology integrates electronics seamlessly into daily activities, adapting to evolving lifestyles and allowing for versatile placement on the body. Facilitated by internet connectivity, data exchange between devices and networks forms the backbone of wearable technology. The global wearable technology market consists of North America (USA, Canada), Europe (Germany, UK, France, and others), Asia Pacific (India, China, Japan, South Korea, and others), and other regions (Mordor Intelligence, 2023).

Therefore, the wearable device industry encompasses the design, manufacture, and distribution of smart electronic gadgets that are worn on the body. These devices are equipped with advanced sensors, processors, and connectivity technologies to provide various functions and services to users. The industry includes products such as fitness trackers, smartwatches, smart clothing, augmented reality glasses, and health monitoring devices (OmniCard, 2024). Additionally, the industry is characterized by intense competition among manufacturers seeking to innovate and differentiate their products in a crowded market. Overall, the wearable device industry is poised for continued growth and innovation as technology advances, consumer demands evolve, and new use cases for wearables emerge across various sectors including healthcare, fitness, entertainment, and enterprise applications. This industry has been growing continuously and tremendously in the present digital and internet technology era.

Structural Equation Modeling (SEM): Structural Equation Modeling (SEM) is a statistical technique that integrates factor analysis and multiple regression analysis. This allows researchers to explore complex relationships among observed and latent variables. SEM is employed to test theoretical models that outline how different constructs are interconnected (Olsson, U. et al, 2000). Structural theory illustrates the interrelationships among latent variables—specifically, it delineates the constructs and their path relationships within the structural model. The arrangement and order of these constructs are informed by theoretical frameworks, the researcher's expertise, accumulated knowledge, or a combination of both. In path models, the flow is typically from left to right: independent variables are positioned on the left, while dependent variables appear on the right (Hair Jr, J.F., et al, 2021a).

Structural equation modeling (SEM) is a multivariate data analysis technique used to examine intricate relationships among constructs and indicators. Researchers typically employ two main methods to estimate structural equation models: covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM). CB-SEM is often utilized to confirm existing theories, while PLS-SEM adopts a causal-predictive approach, focusing on prediction and model estimation, with structures designed to offer causal explanations (Hair Jr, J.F., et al, 2021b). This volume is a valuable reference for academic and industry researchers in fields such as engineering, management, psychology, sociology, human resources, and the humanities. The six steps of SEM are data collection, model specification, identification, estimation, evaluation, and modification (Thakkar, J.J., 2020). Those six steps are shown in Figure 3 below, including the step of interpretation and report results.

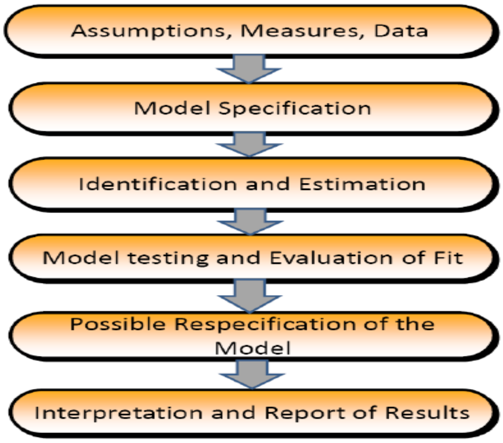

Figure 3: Six Steps of Structural Equation Modeling
(Dragan, D. & Topolsek, D., 2014)

Initially, the researchers have to understand the variables concerned in SEM as they are shown in the next sub-topic.

Variables in SEM: In Structural Equation Modeling (SEM), variables play a crucial role in representing and analyzing the complex relationships among constructs and indicators. These variables can be classified into several categories, each serving a distinct purpose within the modeling framework. Here's a detailed explanation of the different types of variables in SEM (Hair, J.F. et al, 2010, Brown, T.A., 2015, Byrne, B.M., 2016) as the following:

1) Latent Variables: Latent variables (also known as unobserved variables) are theoretical constructs that cannot be directly observed or measured. Instead, they are inferred from other variables, known as indicators. Latent variables are typically represented by ellipses in path diagrams. Examples include concepts like intelligence, satisfaction, and motivation. In SEM, the relationships among latent variables help researchers understand how these abstract concepts influence and interact with one another.

2) Observed Variables: Observed variables (or manifest variables) are directly measurable and serve as indicators for latent variables. They represent the data collected through surveys, tests, or other forms of measurement. Observed variables are typically represented by rectangles in path diagrams. For

example, if "satisfaction" is a latent variable, observed variables could be individual satisfaction scores from survey questions.

3) Independent Variables: Independent variables (also called exogenous variables) are those that are presumed to influence other variables in the model. They are often positioned on the left side of the path model and serve as predictors or causal agents. They do not depend on other variables in the model. In a study investigating the impact of education level on job satisfaction, education level would be an independent variable.

4) Dependent Variables: Dependent variables (or endogenous variables) are outcomes that are influenced by independent variables within the model. They are represented on the right side of the path model and are determined by the relationships established with other variables. Continuing with the previous example, job satisfaction would be a dependent variable since it is affected by the education level.

5) Intervening Variables: Intervening variables (also known as mediator variables) act as conduits through which independent variables influence dependent variables. They help to explain the process or mechanism by which one variable affects another. For instance, in examining the relationship between income and life satisfaction, "social capital" could be an intervening variable that explains how income impacts life satisfaction.

6) Control Variables: Control variables are variables that researchers include in the model to account for potential confounding effects. By controlling for these variables, researchers can isolate the specific relationships of interest and reduce the risk of spurious associations. For example, in a study on job performance, age, and experience might be included as control variables.

7) Path Relationships: In SEM, the relationships between these variables are represented as paths. Arrows indicate the direction of influence—from independent to dependent variables, along with any mediating effects from intervening variables. The significance and strength of these paths are estimated during the model-fitting process.

In SEM, variables are integral to understanding the intricate web of relationships among constructs. By differentiating between latent and observed variables, independent and dependent variables, and other classifications, researchers can construct a comprehensive model that not only supports theoretical hypotheses but also enhances predictive accuracy. The careful specification and estimation of these variables allow for nuanced insights into complex behavioral and social phenomena (Kline, R.B., 2015). It's very crucial to use the appropriate method(s) for variable selection which means eventually the structural model will reflect the study's results empirically.

Related research: This study is a part of the research on 'Structural Equation Modeling of Factors Influencing the Success of the Wearable Device Industry in Wenzhou, China'. The researchers have studied more than 50 related research. However, the related research can be concluded as the following:

The research on wearable technology in health and fitness has explored various factors influencing adoption and sustained use. A pivotal study by Canhoto (2017) examined the role of user characteristics, environmental factors, and device properties in encouraging the use of health and fitness wearables. It found that while device features that signal data collection capabilities are crucial for initial adoption, the portability and durability of devices are vital for continued use. This differentiation highlights the importance of understanding how different factors support various stages of technology acceptance. Building on this, Rubin & Ophoff (2018) emphasized the need to understand consumer acceptance of wearable technology, particularly in regions where research is limited, such as South Africa. Utilizing the UTAUT2 model, they identified performance expectancy and habit as significant drivers of adoption while noting that hedonic motivation did not significantly influence users' willingness to wear the technology during physical activities. Further, Afrouz & Wahl (2019) analyzed the purchase intentions of smartwatches among German consumers, identifying attitudes as the strongest predictor of purchasing behavior. Their study highlighted the importance of perceived enjoyment and design aesthetics, while subjective norms were found to have a negligible impact on intention. Dunne (2019) explored how colored wearable devices are perceived and categorized by viewers, revealing that product design and body location substantially influence perceptions, even when color did not emerge as a significant factor in decision-making. In their research, Niknejad et al. (2019)

investigated the barriers and motivations impacting the use of smart wearables in Malaysia. By integrating the Value-based Adoption Model with UTAUT2, they established a structure to evaluate factors influencing behavioral intention, affirming the need for further exploration of consumer perspectives. Kao et al. (2019) focused on IoT-based wearable fitness trackers, employing expert consensus to develop a conceptual framework for understanding adoption factors. Their findings confirmed the interplay between technology marketing and consumer behavior. Binyamin & Hoque (2020) studied the drivers of wearable health-monitoring technology in Saudi Arabia, identifying variables such as performance expectancy and social influence as critical to adoption while highlighting areas needing more research. Finally, Kim et al. (2020) examined how health beliefs and information-seeking behaviors affect the use of activity trackers, revealing significant predictors like perceived benefits and self-efficacy regarding obesity. Together, these studies offer comprehensive insights into the multifaceted factors influencing the adoption and sustained use of wearable technology in health and fitness contexts.

Research Methodology

Integration of theory-driven selection and focused group with grounded theory used in this study can be structured as follows:

1. Initial Framework Development: Start with a theory-driven selection to identify key factors based on existing literature, which could guide the initial stages of data collection.

2. Conduct Focus Groups: Gather qualitative data through focus groups to capture diverse perspectives on the wearable device industry in Wenzhou. This will add depth to the understanding of factors influencing success.

3. Grounded Theory Analysis: Analyze the qualitative data through grounded theory coding processes, deriving themes and theories that explain the factors influencing wearable device success based on both the theoretical input and the focus group insights.

4. Conceptual Model Development: Utilize the insights and data to develop a structural equation model (SEM) that represents the interrelationships among the identified factors, validating it with the qualitative findings.

The integration of theory-driven selection, focus groups, and grounded theory offers a comprehensive approach to studying the success of the wearable device industry. By leveraging existing theories, gathering rich qualitative insights, and using systematic data analysis techniques, researchers can develop a nuanced understanding of the specific factors that drive success in Wenzhou's wearable device market. This methodology not only enriches the data quality but also enhances the reliability of the research findings, culminating in a well-supported structural equation model that effectively represents the dynamics of the industry.

Results

The variable selection results showed the variables as follows: Wearable Device Technology Industry: The rapid evolution of wearable technology in China, from basic fitness trackers to advanced devices like smartwatches and augmented reality glasses, has positioned the country as a key player in the global market. This growth is driven by technological advancements, manufacturing expertise, and increasing consumer demand for innovative products.

Factors Affecting Success in the Wearable Device Industry: Success in the wearable device sector is influenced by a variety of factors categorized as technological, market-related, and socio-cultural. Research indicates that market preference, consumer satisfaction, and financial viability are significant indicators of success.

1. Technological Factors: Technological innovation is crucial for the adoption and success of wearable devices. It has been demonstrated that critical components including sensor accuracy, battery life, connection, and user interface design directly affect user happiness, which in turn affects market performance.

2. Market-Related Factors: Effective management of market-related variables—like pricing strategy, brand reputation, and distribution channels—has been identified as vital for the success of wearable technology companies. These factors are interconnected and play a significant role in shaping the market landscape.

3. Socio-Cultural Factors: The socio-cultural environment in China significantly affects the adoption of wearable devices. Research highlights are cultural preferences and social norms are key determinants that influence consumer attitudes, suggesting that culturally appropriate designs are essential for market success.

The results above go to the brief matrix table as shown in Table 1 below.

Table 1: Summary of concepts, theories, and variables

Concepts/Theories/Variables used in this research	
Wearable Device Technology Industry	All related research studied wearable device Technology and its industry.
Technological Variables	Suttisaksri (2020), Rubin & Ophoff (2018), Afrouz & Wahl (2019), Dunne (2019), Niknejad (2019), Kao (2019), Binyamin (2019), Kim, Hong, & Kim (2020), Rabaai & Zhu (2021), Vijayan (2021), Yang (2022), Sagmanli (2022), El-Masri, Al-Yafi, & Kamal (2022), Wang (2023)
Market-Related Variables	Afrouz & Wahl (2019), Dunne (2019), Kao (2019), Binyamin (2019), Binyamin (2019), Rabaai & Zhu (2021), Yang (2022), Sagmanli (2022), El-Masri, Al-Yafi, & Kamal (2022)
Socio-Cultural Variables	Kornmai (2018), Dunne (2019), Niknejad (2019), Binyamin (2019), Rabaai & Zhu (2021), Vijayan (2021), Yang (2022), Sagmanli (2022), El-Masri, Al-Yafi, & Kamal (2022), Wang (2023)

Moreover, variables were found 3 major independent variables; technological, market-related, and socio-cultural variables. Each of the major variables has sub-variables that can be used to conduct the conceptual framework and feasible model of the research that will be shown in Figure 4.

Three possible influencing variables (factors), technological, market-related, and socio-cultural—are considered independent variables, while the key success factors are the dependent variables. Each main factor in the conceptual framework has specific subfactors. Each of them consists of the following:

1. Technological Factors (TF):
   - Sensor accuracy (TF1)
   - Battery life (TF2)
   - Connectivity (TF3)
   - User interface design (TF4)
2. Market-Related Factors (MF):
   - Pricing strategy (MF1)
   - Brand reputation (MF2)
   - Distribution channels (MF3)
   - Market positioning (MF4)
3. Socio-Cultural Factors (SF):
   - Cultural preference (SF1)

- Social norms (SF2)
- Consumer attitudes (SF3)

4. Key Success Factors (KSF) of the Wearable Device Industry:
    - Market preference (KSF1)
    - Consumer satisfaction (KSF2)
    - Financial viability (KSF3)

Discussions

China's wearable technology business has developed quickly, moving from simple fitness trackers to sophisticated smartwatches and augmented reality glasses, positioning the nation as a major player in the world market. Success in this sector is influenced by technological, market-related, and socio-cultural factors, with key indicators including market preference and consumer satisfaction. Technological innovation particularly in sensor accuracy and user interface design, directly impacts user satisfaction. Effective distribution, price, and brand management strategies also improve market performance. While Structural Equation Modeling (SEM) offers valuable insights into these complex relationships, a comprehensive exploration of the interplay between these factors in the Chinese context remains a significant research gap that this study aims to address.

New Knowledges

The variables and their sub-variables (subfactors) shown above have been obtained from the integration of theory-driven selection and focused group with the grounded theory that helped the researchers conduct the feasible model as shown in Figure 4.

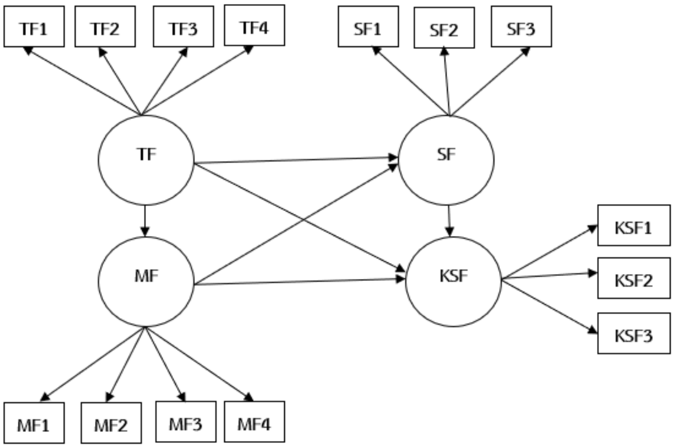

Figure 4: Feasible model

Conclusions

The changes in China's wearable device technology industry—from basic devices to advanced items, such as smartwatches and augmented reality glasses—have positioned the country as a key global player. Success in this sector is influenced by technological, market-related, and socio-cultural factors, with key indicators such as market preference and consumer satisfaction. Technological innovation, particularly in sensor accuracy and user interface design, directly impacts user satisfaction. Additionally, effective management of pricing, brand reputation, and distribution enhances market performance. While Structural Equation Modeling (SEM) offers valuable insights into these complex relationships, a comprehensive exploration of the interplay between these factors in the Chinese context remains a significant research gap that this study addresses. The variables and their sub-variables (subfactors) were derived through an integration of theory-driven selection and focused group discussions, combined with grounded theory, enabling the researchers to develop a feasible model.

References

Binyamin, S., & Hoque, R. (2020). **Understanding the drivers of wearable health monitoring technology: An extension of the unified theory of acceptance and use of technology.** MOPI 12(9605) 1-20.

Brown, T.A., 2015, **Confirmatory Factor Analysis for Applied Research.** Guilford Press.

Bryant, A. (2002). **Re-grounding Grounded Theory.** The Journal of Grounded Theory Research, 1(1): 1-17.

Byrne, B.M. (2016). **Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming.** 3rd ed. Routledge.

Canhoto, A.I. (2017). **Exploring the factors that support the adoption and sustained use of health and fitness wearables**. Journal of Marketing Management, 33(1-2), 32-60.

Charmaz, K. (2006). **Constructing Grounded Theory: A Practical Guide through Qualitative Analysis.** Sage Publications.

Dragan, D. & Topolsek, D. (2014). **Introduction to Structural Equation Modeling: Review, Methodology and Practical Applications.** The International Conference on Logistics & Sustainable Transport 2014 Celje, Slovenia: 1-27.

Hair Jr, J.F., et al. (2021a). **An Introduction to Structural Equation Modeling.** Springer Link: 1-29.

Hair Jr, J.F., et al. (2021b). **Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R – A Workbook.** Springer Link: 1-29.

Hair, J.F. et al, 2010, **Multivariate Data Analysis.** 7th ed. Pearson.

Kao, Y.S. et al. (2019). **An Exploration and Confirmation of the Factors Influencing Adoption of IoT-Based Wearable Fitness Trackers.** International Journal of Environmental Research and Public Health 16(3227) 1-31.

Kline, R. B. (2015). **Principles and Practice of Structural Equation Modeling**. 4th ed. Guilford Press.

Krueger, R.A. & Casey, M.A. (2015). **Focus Groups: A Practical Guide for Applied Research.** 5th ed. Sage Publications.

Luczak, T. et al., (2020). **State-of-the-art review of athletic wearable technology: What 113 strength and conditioning coaches and**

athletic trainers from the USA said about technology in sports. International Journal of Sports Science Coach 15(1): 26-40.

MacCallum, R. C., & Austin, J. T. (2000). **Applications of Structural Equation Modeling in Psychological Research.** Annual Review of Psychology, 51(1), 201-226.

Morgan, D.L. (1997). **Focus Groups as Qualitative Research.** 2nd ed. Sage Publications.

Niknejad, N. et al. (2019). **A confirmatory factor analysis of the behavioral intention to use smart wellness wearables in Malaysia.** Universal Access in the Information Society. Retrieved from https://doi.org/10.1007/s10209-019-00663-0

Olsson, U. H., Foss, T., Troye, S. V., & Howell, R. D. (2000). **The performance of ML, GLS, and WLS estimation in structural equation modeling under conditions of misspecification and nonnormality.** Structural Equation Modeling 7(4), 557-595.

OmniCard. (2024). **Wearables: What is Wearable Technology and Benefits of Wearable Technology?** Retrieved from https://omnicard.in/blogs/wearables-100124

Pharmiweb. (2024). **Wearable Technology Market Trends: A Journey Towards USD231 Billion by 2032.** Retrieved from https://www.pharmiweb.com/press-release/2024-04-18/wearable-technology-market-trends-a-journey-towards-usd-231-billion-by-2032

Rubin, A., & Ophoff, J. (218). **Investigating adoption factors of wearable technology in health and fitness.** Retrieved from https://doi.org/10.1109/OI.2018.8535831

Saldana, J. (2016). **The Coding Manual for Qualitative Researchers.** 3rd ed. Sage Publications.

Schumacker, R. E., & Lomax, R. G. (2016). **A Beginner's Guide to Structural Equation Modeling.** 3rd ed. Routledge.

Sharma, A. et al. (2022). **Advancements and future prospects of wearable sensing technology for healthcare applications.** Royal Society of Chemistry 1, 387-404.

Stewart, D.W. & Shamdasani, P.N. (2014). **Focus Groups: Theory and Practice.** 3rd ed. Sage Publications.

Thakkar, J.J. (2020). **Structural Equation Modelling: Application for research and practice (with AMOS and R).** Springer Singapore.

Vorecol. (2024). **What are the current trends in wearable technology for health and wellness monitoring?** Retrieved from https://psico-smart.com/en/blogs/blog-what-are-the-current-trends-in-wearable-technology-for-health-and-wellness-monitoring

Wu, X. & Wu, D. (2023). **Innovation-Driven Development in China: Catch-Up and Beyond.** China Economist 18(4): 101-114.

Yasar, K. (2023). **Wearable Technology.** Retrieved from https://www.techtarget.com/searchmobilecomputing

Yetisen, A.K. et al. (2018). **Wearable in Medicine.** Advanced Materials 1706910: 1-26.