THE DEVELOPMENT OF THAILAND'S NATIONAL SPORTS DEVELOPMENT FUND (NSDF) AND THE NSDF MANAGEMENT STRATEGY

Thanaphon Cheungsirakulvit[1*] , Piched Girdwichai[2]
[1, 2,3]College of Innovation and Management, Suan Sunandha Rajabhat University, Thailand*
E-mail: thanaphon.ch@ssru.ac.th, piched.gi@ssru.ac.th

ABSTRACT

This article provides an overview of Thailand's National Sports Development Fund (NSDF) development and explores the NSDF management strategy for the country's sports development. The in-depth interview with the Sports Authority of Thailand, The National Sports Associations, The Provincial Sports Associations, and the NSDF were conducted and analyzed to provide the up-to-date primary data and to reflects current issues and trends. The article is organized into four sections. The first section briefly describes the government's involvement in sports and various landmarks in developing Thailand's sports policy and the NSDF. The second section discusses the current administrative structure and funding, focusing on the machinery of government, the body responsible for sport. The third section studies the significance of the relationship between the Sports Authority of Thailand, The National Sports Associations, The Provincial Sports Associations, and the NSDF. The final section identifies several emergent public policy priorities and funding trends and discusses the importance of sports as a political issue. To conclude, this article will give the update up to date data with current issues and development trends for sports development in Thailand in big picture.

Keywords: National Sports Development Fund, Management Strategy, Sports Management, Sports Development.

INTRODUCTION

The role of sports in shaping a nation's character, fostering social cohesion, and promoting physical and mental well-being cannot be overstated. Recognizing this, many countries have established funding programs to support their national sports development efforts. In Thailand, the National Sports Development Fund (NSDF) plays a critical role in promoting and advancing sports at various levels, contributing to the nation's overall growth and prosperity. This paper aims to explore the establishment and evolution of the NSDF, as well as to analyze the management strategies employed to ensure its effectiveness in supporting Thailand's sports development.

Established in 1999, the NSDF was designed to provide financial assistance to athletes, coaches, and sports organizations, while also fostering an environment that nurtures talent, encourages participation, and enhances competitiveness at both national and international levels. Over the years, the NSDF has played a pivotal role in the growth of sports in Thailand, with notable successes in various fields, including martial arts, badminton, and weightlifting, among others.

This study delves into the intricate history of the NSDF, examining the factors that led to its establishment, the key milestones achieved since its inception, and the challenges encountered along the way. Furthermore, this paper analyzes the management strategies employed by the NSDF, focusing on aspects such as resource allocation, performance measurement, and stakeholder engagement. By highlighting best practices and identifying areas for improvement, this research aims to provide valuable insights into the NSDF's management and contribute to the ongoing discourse on effective sports development funding.

The findings of this study hold practical implications for policymakers, sports organizations, and other stakeholders involved in the development and promotion of sports in Thailand. By understanding the factors that have contributed to the success of the NSDF and evaluating its management strategy, these stakeholders can make informed decisions to further enhance the impact of the fund and promote sports development in the country. Moreover, the lessons learned from the Thai experience may prove valuable for other nations striving to establish or refine their own sports development funds.

A brief history of Thailand Sport Policy

Thailand's sport policy has undergone significant transformations over the years, reflecting the country's changing priorities and aspirations in the domain of sports. A brief history of Thailand's sports policy can be divided into four main phases, each characterized by distinct objectives and approaches:

1. Pre-1950s: Traditional Sports and Physical Education

Before the 1950s, sports in Thailand were primarily centered around traditional activities such as Muay Thai (Thai boxing), takraw (a Southeast Asian game similar to volleyball), and boat racing (Chaiyanan, 2012). During this period, the central focus of sports policy was on promoting physical education and cultural preservation (Iamartino, 2017). The establishment of the Thai Physical Education Department in 1922 marked the commencement of organized efforts to develop sports and physical education in the country (Chaiyanan, 2012).

2. 1950s-1970s: The Emergence of Modern Sports

The 1950s marked a turning point in Thailand's sports policy, as the country started to embrace modern sports, influenced by its participation in international events such as the Asian Games and the Olympic Games (Siriwan, 2009). This period saw the establishment of the National Olympic Committee of Thailand in 1951 and the construction of the first National Stadium in 1953 (Iamartino, 2017). Thailand's sports policy during this time focused on promoting national pride, fostering international cooperation, and enhancing the country's competitiveness on the global stage (Siriwan, 2009).

3. 1980s-1990s: Expanding Access and Infrastructure

As Thailand's economy grew in the 1980s and 1990s, the government began to invest more resources in sports development, aiming to broaden access to sports and improve sports infrastructure (Yamprasert & Saengsirisuwan, 2013). The country's sports policy during this time focused on building sports facilities, nurturing grassroots talent, and promoting mass sports participation (Iamartino, 2017). The establishment of the Sports Authority of Thailand (SAT) in 1985 and the National Sports Development Fund (NSDF) in 1999 exemplify the government's commitment to promoting sports development during this period (Chaiyanan, 2012).

4. 2000s-Present: Professionalism, High Performance, and Social Development

In the 21st century, Thailand's sports policy has further evolved to emphasize professionalism, high-performance sports, and the broader social benefits of sports participation (Yamprasert & Saengsirisuwan, 2013). The country's sports policy now aims to support elite athletes in achieving international success while also promoting sports as a means of fostering social cohesion, improving public health, and enhancing the quality of life (Iamartino, 2017). Key initiatives in this era include the establishment of specialized sports academies, the launch of programs to promote sports tourism, and the continued investment in sports infrastructure and development projects (Siriwan, 2009).

In summary, Thailand's sports policy has evolved from a focus on traditional sports and physical education to a comprehensive approach that emphasizes elite performance, mass participation, and social development. This progression reflects the country's changing priorities and aspirations in sports, as well as its increasing engagement with the international sports community (Iamartino, 2017).

Not-for-Profit and Commercial Sectors in Sports and the Professional Sports Development

In addition to government-led efforts, the not-for-profit and commercial sectors play crucial roles in shaping Thailand's sports landscape and driving professional sports development. These sectors encompass sports associations and federations, non-governmental organizations (NGOs), private corporations, and professional sports clubs, all of which contribute to the overall growth and success of sports in the country (Yamprasert & Saengsirisuwan, 2013).

1. Sports Associations and Federations

Sports associations and federations, typically not-for-profit organizations, are responsible for governing various sports disciplines in Thailand (Siriwan, 2009). These organizations work closely with the Sports Authority of Thailand (SAT) to develop and promote their respective sports, organize competitions, and provide training opportunities for athletes and coaches (Chaiyanan, 2012). The national sports associations and federations also play a key role in preparing and sending athletes to represent Thailand in international competitions, such as the Olympic Games and the Asian Games (Iamartino, 2017).

2. Non-Governmental Organizations (NGOs)

NGOs in the sports sector contribute to sports development in Thailand by providing specialized programs and services, such as talent identification, athlete support, and community sports initiatives (Yamprasert & Saengsirisuwan, 2013). These organizations often collaborate with government agencies, sports associations, and other stakeholders to develop targeted sports programs aimed at enhancing sports participation and performance at various levels (Khan, 2021).

3. Private Corporations

Private corporations play a significant role in supporting sports development in Thailand through sponsorship, investment, and partnership initiatives (Chaiyanan, 2012). These corporations provide financial support to athletes, teams, and sports events, helping to bridge the gap between public funding and the resources required for the professional development of sports (Yamprasert & Saengsirisuwan, 2013). Private sector involvement in sports also contributes to the growth of sports marketing, branding, and commercialization, which are essential for sustaining professional sports and generating revenue (Khan, 2021).

4. Professional Sports Clubs

Professional sports clubs are instrumental in fostering the growth of professional sports in Thailand. These clubs, often supported by private corporations, provide a platform for athletes to compete at a higher level and gain exposure to professional competition (Siriwan, 2009). Professional sports clubs also contribute to the development of sports infrastructure, such as training facilities and stadiums, and promote sports as a viable career option for talented athletes (Yamprasert & Saengsirisuwan, 2013).

The not-for-profit and commercial sectors play vital roles in driving professional sports development in Thailand. Through sports associations and federations, NGOs, private corporations, and professional sports clubs, these sectors complement government-led efforts to promote sports, enhance performance, and foster a culture of sporting excellence in the country.

Strategy for NSDF in Developing Thailand Sports and Professional Sports

The National Sports Development Fund (NSDF) plays a crucial role in shaping the future of sports in Thailand. In this chapter, we explore the various strategies that the NSDF can implement to develop Thai sports and professional sports, with a focus on fostering talent, enhancing infrastructure, and promoting sports at all levels. The chapter is structured as follows: 1) discusses talent identification and development; 2) focuses on coaching and technical support;

3) examines infrastructure and facilities development; 4) highlights public and private partnerships; 5) delves into international cooperation and exposure; 6) addresses marketing and promotion of professional sports; and 7) underscores good governance and management practices. The chapter concludes in 8) by summarizing the main strategies and emphasizing the importance of a comprehensive and coordinated approach to sports development in Thailand.

1) Talent Identification and Development

Talent identification and development are crucial components of sports development, as they ensure a continuous pipeline of skilled athletes who can excel at both national and international levels (Vaeyens, Gullich, Warr, & Philippaerts, 2009). For the NSDF to effectively develop Thailand sports and professional sports, it is essential to implement the following strategies:

1. Establishing talent identification programs for early detection of potential athletes: Talent identification programs can help spot promising athletes at a young age and channel resources towards their development (Vaeyens et al., 2009). The NSDF can collaborate with schools, local sports clubs, and regional sports associations to organize talent scouting events and competitions, enabling the identification of athletes with exceptional potential (Baker, Schorer, & Cobley, 2012).

2. Implementing long-term athlete development plans to nurture and support athletes throughout their careers: Long-term athlete development plans provide a structured and systematic approach to athlete development, ensuring that athletes receive the appropriate support at different stages of their careers (Ford et al., 2011). The NSDF can work with sports organizations and experts to develop tailored athlete development plans, taking into account the specific needs and requirements of different sports disciplines (Lloyd & Oliver, 2012).

3. Collaborating with schools, universities, and local sports clubs to promote grassroots development: Grassroots development plays a critical role in fostering a sports culture and widening the talent pool (Coakley, 2011). The NSDF can support initiatives that encourage sports participation at the community level, such as the establishment of school sports programs, university sports scholarships, and local sports clubs (Güllich, 2014).

In conclusion, talent identification and development are vital strategies for the NSDF in developing Thai sports and professional sports. By focusing on early detection, long-term athlete development plans, and grassroots development, the NSDF can ensure a steady supply of talented athletes who can excel on the global stage.

2) Coaching and Technical Support

High-quality coaching and technical support are fundamental to the development of athletes and the overall success of sports programs (Côté & Gilbert, **2009).** To enhance the growth of Thai sports and professional sports, the NSDF should focus on the following strategies related to coaching and technical support:

1. Enhancing the quality of coaching through training and certification programs: Coaches play a critical role in shaping athletes' performance, motivation, and well-being (Cushion, Armour, & Jones, 2006). The NSDF can support the professionalization of coaching in Thailand by developing and implementing coach education programs and certification pathways, ensuring that coaches possess the necessary knowledge and skills to effectively support athletes (Nash & Sproule, 2012).

2. Attracting and retaining top-level coaches and sports scientists to support elite athletes: To compete at the highest levels, Thai athletes need access to world-class coaching and sports science support (Mujika et al., 2018). The NSDF can facilitate the recruitment of experienced coaches and sports scientists, both domestically and internationally, and provide incentives to attract and retain top talent in the field (Mallett & Lara-Bercial, 2016).

3. Providing technical assistance and resources to local sports organizations: Local sports organizations often lack the resources and expertise needed to develop athletes and organize high-quality sports programs (Misener & Doherty, **2009).** The NSDF can offer technical assistance,

resources, and guidance to these organizations, helping them to enhance their capacity and deliver effective sports development initiatives at the grassroots level (Sotiriadou & Shilbury, 2009).

In conclusion, coaching and technical support are essential elements of a comprehensive sports development strategy. By focusing on enhancing the quality of coaching, attracting and retaining top-level coaches and sports scientists, and providing technical assistance to local sports organizations, the NSDF can contribute to the growth and success of Thai sports and professional sports.

3) Infrastructure and Facilities Development

Adequate infrastructure and facilities are essential for fostering a high-performance sports culture and facilitating athlete development (Gratton & Jones, 2010). To support the growth of Thai sports and professional sports, the NSDF should prioritize the following strategies related to infrastructure and facilities development:

1. Investing in modern sports facilities and infrastructure to support high-performance training and competition: High-quality sports facilities and infrastructure are necessary for athletes to train and compete at the highest level (Gratton & Jones, 2010). The NSDF can work with government agencies, sports organizations, and private partners to invest in the construction and maintenance of state-of-the-art training centers, stadiums, and other sports facilities (Chalip, 2006).

2. Ensuring equitable access to sports facilities across the country: To promote widespread sports participation and talent development, it is crucial to provide equitable access to sports facilities for athletes from different regions and socio-economic backgrounds (Coalter, 2007). The NSDF can collaborate with local authorities to develop and implement strategies that ensure the fair distribution of sports facilities and resources across the country (Horne & Manzenreiter, 2006).

3. Encouraging the development of regional and community-based sports centers: Regional and community-based sports centers play a vital role in nurturing local talent and fostering a sports culture at the grassroots level (Taylor, Barrett, & Nichols, 2018). The NSDF can provide financial and technical support to initiatives aimed at establishing and maintaining these centers, thereby creating more opportunities for athletes to develop their skills and participate in sports activities within their local communities (Hoye, Nicholson, & Brown, 2015).

In conclusion, infrastructure and facilities development is a key component of a comprehensive sports development strategy. By focusing on investing in modern sports facilities, ensuring equitable access, and encouraging the development of regional and community-based sports centers, the NSDF can contribute to the advancement of Thai sports and professional sports.

4) Public and Private Partnerships

Strengthening partnerships between the NSDF, commercial sectors, and not-for-profit organizations is essential for the sustainable development of Thai sports and professional sports. By leveraging the unique resources and capabilities of various stakeholders, these partnerships can maximize the impact of sports development initiatives (Babiak & Thibault, 2009). The NSDF should focus on the following strategies related to public and private partnerships:

1. Encouraging private sector investment in sports through sponsorship and commercial opportunities: Private sector investment can provide valuable financial resources for sports development, support the professionalization of sports, and enhance the visibility of Thai athletes (Chelladurai & Madella, 2006). The NSDF can collaborate with sports organizations and marketing agencies to create attractive sponsorship and commercial opportunities for businesses, thereby incentivizing private sector investment in sports (Amis, Slack, & Berrett, 1999).

2. Utilizing public-private partnerships to enhance the sustainability of sports development initiatives: Public-private partnerships (PPPs) can facilitate the sharing of resources, knowledge, and expertise among stakeholders, leading to more effective and sustainable sports development programs (Grix & Carmichael, 2012). The NSDF can explore opportunities to establish PPPs with private entities and not-for-profit organizations to jointly develop and manage

sports facilities, organize events, and implement athlete support programs (Walters & Anagnostopoulos, 2018).

3. Fostering collaboration between sports organizations, educational institutions, and community groups: Cross-sector partnerships can create synergies that enhance the reach and impact of sports development initiatives (Misener & Doherty, 2009). The NSDF can facilitate collaboration between sports organizations, educational institutions, and community groups to promote sports participation, develop talent, and support athletes throughout their careers (Skille, 2010).

In conclusion, public and private partnerships play a crucial role in the development of Thai sports and professional sports. By encouraging private sector investment, utilizing public-private partnerships, and fostering cross-sector collaboration, the NSDF can maximize the effectiveness and sustainability of sports development initiatives in Thailand.

5) International cooperation and exposure.

International collaboration and exchange can contribute significantly to the development of Thai sports and professional sports by fostering knowledge transfer, enhancing cultural understanding, and promoting global sports diplomacy (De Bosscher, Shibli, Westerbeek, & van Bottenburg, 2015). The NSDF should prioritize the following strategies related to international collaboration and exchange:

1. Establishing partnerships with international sports organizations and institutions: Collaborating with international sports organizations and institutions can provide opportunities for Thai sports organizations to learn from global best practices, access resources, and participate in global sports governance (De Bosscher et al., 2015). The NSDF can facilitate the establishment of strategic partnerships and agreements with relevant international stakeholders to enhance the global integration of Thai sports and professional sports.

2. Encouraging athlete and coach exchange programs: Athlete and coach exchange programs can provide valuable learning experiences, promote cultural understanding, and foster international sportsmanship (Giulianotti & Robertson, 2007). The NSDF can support the development and implementation of such exchange programs, enabling Thai athletes and coaches to train and compete in different cultural contexts and learn from international experts (Houlihan & Green, 2009).

3. Hosting and participating in international sports events and conferences: Hosting and participating in international sports events and conferences can raise the profile of Thai sports, showcase the country's sports infrastructure, and provide opportunities for knowledge exchange among sports practitioners and researchers (Chalip, 2006). The NSDF can work with government agencies, sports organizations, and private partners to bid for and host such events, as well as encourage Thai sports professionals to participate in international conferences and forums.

In conclusion, international collaboration and exchange are vital components of a comprehensive sports development strategy. By establishing partnerships with international sports organizations, encouraging athlete and coach exchange programs, and hosting and participating in international sports events and conferences, the NSDF can contribute to the global integration and development of Thai sports and professional sports.

6) Marketing and Promotion of Professional Sports

Marketing and promotion are key components of professional sports development, as they can enhance the visibility and attractiveness of sports, generate revenue, and attract new fans and participants (Masteralexis, Barr, & Hums, 2011). The NSDF should prioritize the following strategies related to marketing and promotion of professional sports in Thailand:

1. Developing and implementing comprehensive marketing plans for professional sports: Comprehensive marketing plans can guide the promotion of professional sports, establish brand identities, and target specific segments of the market (Fullerton, 2010). The NSDF can collaborate with sports organizations, marketing agencies, and other stakeholders to develop and implement

such plans, ensuring consistency and coherence in marketing efforts across different sports and events.

2. Utilizing digital and social media platforms to engage fans and promote professional sports: Digital and social media platforms provide powerful tools for engaging fans, showcasing athletes, and promoting events (Pegoraro, 2010). The NSDF can work with sports organizations and marketing agencies to develop and implement digital marketing strategies that leverage the unique features and capabilities of various platforms, such as live streaming, fan interaction, and content sharing.

3. Exploring innovative sponsorship and advertising opportunities: Innovative sponsorship and advertising opportunities can generate revenue for professional sports, enhance brand visibility, and create value for sponsors (Chadwick, 2010). The NSDF can collaborate with sports organizations and marketing agencies to identify and pursue such opportunities, ensuring that they align with the strategic objectives and values of professional sports in Thailand.

4. Building strategic partnerships with media organizations: Strategic partnerships with media organizations can facilitate the coverage and promotion of professional sports, enhancing their visibility and reach (Hutchins & Rowe, 2012). The NSDF can work with media organizations to negotiate broadcasting rights, develop media partnerships, and promote the coverage of Thai professional sports both domestically and internationally.

In conclusion, marketing and promotion play a vital role in the development of professional sports in Thailand. By developing comprehensive marketing plans, utilizing digital and social media platforms, exploring innovative sponsorship and advertising opportunities, and building strategic partnerships with media organizations, the NSDF can contribute to the growth and sustainability of professional sports in the country.

7) Good Governance and Management Practices

Good governance and management practices are essential for the effective functioning and long-term sustainability of sports organizations, as well as the development of professional sports in Thailand (Ferkins, Shilbury, & O'Boyle, 2017). The NSDF should prioritize the following strategies related to good governance and management practices:

1. Establishing clear governance structures and processes for sports organizations: Clear governance structures and processes can enhance decision-making, transparency, and accountability within sports organizations (Geeraert, 2015). The NSDF can collaborate with sports organizations to develop and implement governance frameworks that outline roles and responsibilities, decision-making processes, and mechanisms for oversight and accountability.

2. Promoting ethical leadership and organizational culture: Ethical leadership and a positive organizational culture are essential for fostering trust, integrity, and effective management within sports organizations (Maak & Pless, 2006). The NSDF can support the development of ethical leadership and organizational culture through training, education, and the promotion of best practices, as well as by setting an example through its own governance and management practices.

3. Encouraging financial transparency and sustainability: Financial transparency and sustainability are crucial for ensuring the long-term viability of sports organizations and professional sports development in Thailand (Hoye & Cuskelly, 2007). The NSDF can work with sports organizations to develop and implement financial reporting standards, conduct financial audits, and provide guidance on revenue generation and financial management strategies.

4. Implementing continuous improvement and learning processes: Continuous improvement and learning processes can help sports organizations adapt to changing environments, address challenges, and capitalize on opportunities (Sotiriadou, Shilbury, & Quick, 2008). The NSDF can support the implementation of continuous improvement and learning processes by facilitating knowledge sharing, providing access to resources and expertise, and encouraging the use of performance monitoring and evaluation systems.

Good governance and management practices are vital for the development of professional sports in Thailand. By establishing clear governance structures, promoting ethical leadership and organizational culture, encouraging financial transparency, and implementing continuous improvement processes, the NSDF can contribute to the effective functioning and long-term sustainability of sports organizations in the country.

CONCLUSION AND SUGGESTIONS

In conclusion, the development of Thailand's National Sports Development Fund (NSDF) and the NSDF management strategy are crucial for the advancement of sports and professional sports in Thailand. This paper has outlined several key areas of focus for the NSDF, including sports infrastructure, talent identification and development, sports science and technology, not-for-profit and commercial sectors, marketing and promotion, international collaboration, athlete welfare, and good governance and management practices. By addressing these aspects, the NSDF can contribute significantly to the growth, competitiveness, and sustainability of Thai sports and professional sports.

Based on the discussions presented in this paper, the following suggestions are offered for the NSDF and other stakeholders involved in the development of Thai sports:

1. Adopt a comprehensive and holistic approach to sports development that takes into account various aspects of sports, such as infrastructure, talent development, science and technology, and governance.
2. Foster collaboration and partnerships among different stakeholders, including government agencies, sports organizations, educational institutions, the private sector, and not-for-profit organizations, to leverage resources, expertise, and networks for the benefit of Thai sports and professional sports.
3. Prioritize the welfare and well-being of athletes, ensuring that they receive the necessary support and resources to excel in their sport and maintain a balanced life.
4. Embrace innovation and technology to enhance sports performance, training, and management practices, as well as to create new opportunities for revenue generation and fan engagement.
5. Promote good governance and management practices within sports organizations to ensure transparency, accountability, and effective decision-making.
6. Focus on marketing and promotion to increase the visibility and attractiveness of Thai sports and professional sports, both domestically and internationally.
7. Engage in international collaboration and exchange to learn from global best practices, foster cultural understanding, and promote sports diplomacy.

By implementing these suggestions and adopting a strategic, collaborative approach to sports development, the NSDF and other stakeholders can contribute to the continued growth and success of Thai sports and professional sports. Ultimately, this will not only benefit athletes, coaches, and sports organizations, but also enhance Thailand's national pride and global standing in the world of sports.

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EVALUATING THE ROLE OF INNOVATIVE TECHNOLOGIES IN CHINA'S FINANCIAL INCLUSION MILESTONE

Pengxuan Liu[1*]
[1*] *Suan Sunandha Rajabhat University, Dusit, Bangkok, Thailand,*
E-mail: 807627209@qq.com

ABSTRACT

The digital revolution has fostered financial inclusion and China has achieved remarkable success in this journey by leveraging technologies such as internet and mobile phones. This study aims to evaluate the role of technology, in terms of Internet, Big data and Machine Learning, in driving digital financial inclusion in China with reference to existing literatures. It is concluded that technologies merely act as supporter and facilitator of the financial development and inclusion, while the key player remain with the government. This study highlights the problems attached to the digital finance in China, and the how the government could play a role to address such issues. It is concluded that while innovative technologies accelerate the process of financial inclusion, it is crucial to invest in digital literacy and connectivity to close the access gaps to financial services. As this study mainly focus on Internet and fintech, future research is recommended to evaluate how the Regulatory Technology (RegTech) and Block-Chain Technology in mitigating financial risks and uncertainties and whether digital yuan has a significant impact on financial inclusion since the research on this topic area is limited.

Keywords: Financial Inclusion, Fintech, Digital Finance, Microlending, Innovative Finance

INTRODUCTION

Financial inclusion is one of the world's most pressing issue as the World Bank estimates that 1.7 billion adults, approximately 33% of the total adults are remained unbanked (Kunt et al., 2018). Inequalities in access to financial services is the main cause of this problem. While the vast majority of people in developed economies enjoy the benefits of modern financial services, these services are found unavailable or restricted to those who can afford them in many parts of the world, particularly in developing economies. This is a major barrier to economic and social progress. The causes of financial exclusion include the inability to access financial services, the inability to afford financial services, and inappropriate use of financial services. Fortunately, financial services providers and the government have made an effort to leverage their available resources and authorities to extend the number of people who can benefit from these services. A recently published journal regarding the overview of financial inclusion in China by Chen &Yuan (2021) inspired this study to critically analyse the role of innovative technologies in China's financial inclusion milestone. Section 2 will provide a brief background, definition, concepts,

importance of financial inclusion, government intervention, and achievement of China's financial inclusion. Section 3 will explain the types of research and source of information for this study. Section 4, the discussion will evaluate the role of technologies such as the Internet, machine learning and big data analytics, and Biometrics in facilitating and supporting China's financial inclusion.

LITERATURE REVIEW

Financial Inclusion

Financial inclusion, also known as inclusive finance, is construed as the availability and equality of opportunities for individuals and businesses to access appropriate financial services that encompass risk management products, payments, savings, credit, and transactions (Chen & Yuan, 2021; Nanda & Kaur, 2016). Financial inclusion aims to widen the available financial services coverage to the unbanked population or excluded groups in the financial system, which eventually evolves and facilitates a country's financial development (Laeven et al., 2015). Previous works of literature contribute several studies in identifying the impacts of financial inclusion. Financial inclusion is positively significant and has a long-run relationship with stimulating a country's economic growth, especially in remote and rural areas (Kim et al., 2018; Sethi & Acharya, 2018). Dupas & Robinson (2013) claimed that financial inclusion significantly impacts individuals' employment, consumption, and production. A recent research also supported the findings and indicated that it is an important resolution in poverty reduction and closing the income inequality gap (Neaime & Gaysset, 2018; Cumming et al., 2016). Financial inclusion could be measured and evaluated through index systems with three bases: Access, Awareness and Use (Chen & Yuan, 2021; Espinosa-Vega et al., 2020). Access refers to the supply of the available financial services whereby the accessibility and reach of the services are utilized to evaluate the national financial inclusion coverage. On the other hand, awareness refers to the demand for financial services, which is the number of financially literate individuals who wish to make a financial decision that encourages financial well-being. Lastly, Use refers to the usage and consumption of financial services. Other than the three bases mentioned above, studies has shown that the development of financial inclusion is highly determined by macro perspectives and socioeconomic factors, including economic growth, population, social stability, and legal systems (Lopez and Winkler, 2018). Individual characteristics could also influence an individual financial inclusion (Ali, 2019). For example, marital status, age (Nguli & Mukoswa Odunga, 2019) and social status (Shihadeh, 2018) was found to have a negative and significant effect on financial inclusion, while level of education has a positive and significant effect on financial inclusion (Nguli & Mukoswa Odunga, 2019; Shihadeh, 2018).

Financial Inclusion in China

According to China's Plan for Advancing the Development of Financial Inclusion (2016-2020), China's authorities defined financial inclusion as providing financial services for all social strata and groups with appropriate and valid financial services, at an affordable cost, based on the principle of opportunity equality and commercial sustainability (People's Bank of China & World Bank Group, 2018). Although researchers agreed that China has achieved a comfortable level of financial inclusion (Tsai, 2017; Fungáčová & Weill, 2015), millions of unbanked adults in China are still found to be marginalised in the current system hence the room for eradicating financial exclusion remains. Financial inclusion practices are still required to cater to the unserved and underserved populations or groups. Chen & Yuan (2021) commented that China has rich experience in inclusive financial systems and its practices have seen developed toward a sustainable path. It is reflected in the nation's financial inclusion plan (2016-2020) that seeks to deepen financial reforms to serve the historically unserved and underserved groups (i.e. Small

and micro businesses, urban low-income groups, the disabled, the aged and other special groups) better. China's achievement in financial inclusion today is highly attributed to the arduous efforts of past decades. Although few parties contribute to China's financial inclusion today, the main driver is the government who establish various guidelines and policies to encourage the bank sectors, fintech startups, and non-bank companies to utilize the innovative technologies in delivering the financial services to the underserved and unserved populations. Hence, it is sufficient to say that the government are the root cause of the series of actions and results. Below will provide a brief overview of China's financial inclusion milestones and the significance of policy guidance for Chinese banking financial institutions in the commitment to promoting financial inclusion.

The turning point in China's financial inclusion happened since the government approach changed from the reforms of Rural Credit Cooperatives (RCCs) and policy banks to the deployment of agent banking models in 2005 (People's Bank of China & Word Bank Group, 2018; Sparreboom & Duflos, 2012). The reform was mainly due to the social inequalities between the large industrial, government-owned companies and vulnerable groups where new policies were required to achieve social harmony and sustainable development. The central government embarked on a concerted effort to cater for the financial exclusion issues. Some of the initiatives taken including the China Banking Regulatory Commission (CBRC) introduced guidelines and regulations that prioritize the four difficult groups (i.e. rural households, low wage workers, micro-small-or-medium enterprises, unemployed and laid-off workers) to the access to banking services such as basic financial services and credit for enterprise investment purpose. In 2005, guidelines were issued to encourage banks, regardless of their size, to set up small business units in rural or remote areas to ensure the availability of minimal financial services in the townships and villages all around China so as to reach the underserved and unserved better. CBRC thus issued policy documents that intend to reduce the registration requirements of rural financial institutions and consequently lead to a significant increase in the number of banking outlets. The increase in financial services coverage establishes massive access points (i.e. ATMs, banking agents, and POS devices). Other than that, the credit of SMEs was supported by the banks after the government issued subsequent guidelines and policies from 2015 to 2011, most notably was, high incentives were given to the local banks that offer loans to small enterprises. Apart from that, the government interventions (i.e. pilot test of Micro Credit Companies) have contributed to the diversity of financial services available in rural finance that specifically target the underserved and unserved groups' needs.

With the emergence of digital technology, it is found that a vast number of non-bank providers and fintech startups offer financial services (i.e. loans, digital payments, credit and insurance) to promote financial inclusions. The government adopted the "wait and see" approach and tolerated those non-bank services providers targeting SMEs, with the ground rules of appropriate interest rates and deposit mobilization (Chen & Yuan, 2021; People's Bank of China & Word Bank Group, 2018; Tsai, 2017). This gives rise to the rapid expansion of China's digital financial inclusion, drastically improving the accessibility and affordability of financial services in serving the underserved and unserved. It was eventually contributing to the national economic growth (Ahmad et al., 2020). It is suggested that the foresight of China's government that encouraged technology adoption in the finance industry has enabled China to become one of the global leaders (another is India) that reached 87% of financial technology (FinTech) adoption rate in a study across 27 countries (EY, 2019).

METHODOLOGY

This study is conducted through documentary research whereby secondary data includes journals, statistics, whitepapers, articles and reports. This study accesses the China's statistics

report, government policies reports, World Bank database, People's Bank of China's reports, world-recognized consulting firms (Ernst & Young and Deloitte) 's reports and articles, and credible journals from publishing companies (i.e. Elsevier, Emerald, Sage, China Economic Review, Applied Economics Letter and Springer). This research evaluate existing literature arguments, and provide a personal opinion regarding the role of innovative technologies in China's financial inclusion. Unfortunately, there is a lack of information and published documents regarding some innovative technologies such as RegTech and Blockchain in China, hence this study would only discuss technologies such as the Internet, Biometrics, big data analytics and machine learning. The authors of the documents adopted was credited correctly for the reader's convenience and acknowledged the researcher's ideas.

DISCUSSION

Chapter 2 has discussed financial inclusion generally. This chapter will specifically evaluate how innovative technologies, in terms of internet, big data and machine learning, contribute to the China's financial inclusion milestone.

4.1 Internet (Digital Finance)— The Enabler of Fintech Revolution

The Internet encourages innovation for the entrepreneur to start a new business model hence benefiting the society by providing many more convenient and highly accessible financial services. In the internet revolution, China fully leverages its resources to adopt itself to maximise the benefit of digitalization and eventually endured rapid development in developing the digital economy and digital finance (Ahmad et al., 2020). Internet could be the most prominent trend that has boosted the growth of China's financial inclusion and opened up the entrance toward digital financial inclusion. The Internet plays an essential role in overcoming the limitations of traditional brick and mortar bank institutions that prefer to be located in densely populated urban areas, which leaves those excluded groups unable to access financial services and products. The internet revolution disrupted the traditional bank operation model. It contributed to the rise of digital finance, which offers diverse and convenient financial products and services such as digital payment, online remittances, P2P platforms, online loans, online insurances, etc. Taking peer-to-peer (P2P) lending platforms as an example, the concept of this online model is a platform that pools the entrepreneurs (businesses) and private individuals or retail investors to enable funding and investing functions. The P2P platforms have seen exponential growth since 2007 and reported numbers of 5,029 platforms which have over RMB1.09 trillion (US$162 billion) loans outstanding (Tsai, 2017). It has effectively catered the SMEs or startups' funding difficulties in traditional bank institutions while also providing the private individuals or investors with a better return (compared to saving deposits in banks, 1.5% p.a.). However, the government's "wait to see" approach has been abused by the public, be it the lender or borrower. The lax regulations on microlending has led to social issues in which P2P platforms, e.g., Jiedaibao.com, use nude photos as collateral for female college students' loans and threaten them by making their photos public when they are unable to make payments (Liu & Keane, 2020). Other than naked loans, another two types of illegal usury crimes, i.e., campus loan and recipe loan also attract public concern and criticism on the digital financial inclusions (Li et al., 2021). Examining the landscape of China's financial inclusion journey, it is opined that the Internet merely plays a supporter role by stimulating various innovative business models such as P2P platforms, online loans, online remittances and others, the misuse and abuse of technology is inevitable, hence requires government's intervention in enforcing the rules and regulations against these non-bank finance providers.

In addition to stimulating innovative business model, the Internet also opens a competitive market between the two tech giants in China and urges them to provide better services to the citizen to capture market share. Agarwal et al. (2020) indicated that the technology giants in

China, Alibaba and Tencent have contributed significantly to driving the national financial inclusion and FinTech revolutions. They benefitted from its visionary leadership and technological capabilities. These two companies transformed themselves into conglomerates that expanded their business to various sectors such as e-commerce, finance, social media, etc. Alibaba and Tencent's third-party payment services, Alipay and WeChat Pay, respectively contribute significantly to shifting China's payment method from cash to a digital payment system that is relatively convenient and highly accessible to consumers. The benefits provided direct Alipay and WeChat Pay to own a vast customer base with over 475 million and 600 million subscribers (Tsai, 2017). In addition, China Internet Network Info Center reported that 633 million users made online payments in 2019 through Alipay and WeChat, which had seen a significant increase in 2018 (CNIC, 2019). Moreover, due to the competition between two tech giants, the wealth management services (Zhaocaibao & Licaitong), online banks (Mybank and Webank), and credit score systems (Sesame/Zhima Credit & Tencent Credit) were introduced to consummate their financial service coverage. The underserved and unserved groups could quickly and completely access financial services at ease with the assistance of technologies, especially in obtaining a loan (Li et al., 2019).

Combining the fact that there are accumulated over one billion people in China access the Internet through mobile devices and the significant increase in internet penetration rate in rural areas from the year 2014 to 2021 (Thomala, 2022), it is believed that the majority of underserved and unserved groups are currently able to enjoy the benefits of inclusive finance. This is supported by Cao (2018) which found that 81% of the respondent (121,000 rural families) have used banking products and financial services, incredibly familiar with digital payment apps, Alipay and WeChat pay. Online access is the ideal medium to reach a large customer base across the nation. Although China's online penetration is desirable, it does not mean that internet usage will direct to a higher financial inclusion. As per the 41st China Statistical Report on Internet Development (2017), only 16.5% of 772 million internet users use the Internet for financial management (Beckett & Ge, 2018). Studies indicated that internet could only promote financial inclusion to the excluded groups indirectly by introducing digital financial products, the more appropriate approach to maximize the positive impacts led by the internet revolution in financial inclusion is to enhance financial literacy and improving the nation's financial capability and knowledge (Shen et al., 2019; Turvey & Xiong, 2017).

To conclude on this part, the Internet does provide a new option or approach to China's financial inclusion in terms of access and quality of financial products/services. However, the Internet is not a panacea to improve the awareness (financial literacy, financial capabilities and knowledge) and is unable to prevent social issues happening (naked loans), it requires the government to enforce the rules and regulations and ensure the use(benefits) of the Internet are reasonably maximized to the society.

4.2 FinTech - Big Data & Machine Learning

Innovative technologies such as big data analytics and machine learning have lowered the threshold for the excluded group to access credit and obtain loans. In fact, studies reveal that more than half of China's population lacks credit history to loans from formal financial institutions (Chorzempa et al., 2018). However, with the emergence of digital financial inclusion in China, financial sectors have adapted to the disrupting technologies to innovate new financial products to cater to the excluded groups' needs (Zhang et al., 2020). For example, ICBC introduced the "Corporate Easy Loan" for MSEs, which assessed creditworthiness through big data analysis (People Bank of China & World Bank Group, 2018). Similar cases were happening in the financial companies where an AI-based scoring system was deployed to optimize the credit assessment by considering more variables and delivering services to the excluded groups who have no credit history. Individuals' and MSE's repayment abilities were not limited to a few variables. Variables such as the purchasing behaviours, living costs, average salaries of a particular age and others were considered during the modelling process (machine learning) to

ensure a nuanced data evaluation. Online banks in China as mentioned above, the WeBank and MYbank, subsidiaries companies from the two tech giants, have the advantage in implementing this new credit evaluation system compared to the traditional banking institutions. This is because both online banks have a large customer base and transactional data shared by their parent companies, hence the massive amount of individuals' data is more easily accessed and ensures the reliability of the data models formed. Consequently, individuals without credit history could still generate credit records when they conduct payments through WeChat Pay and Alipay (Zhang et al., 2020). It is viewed that the technologies have benefited the underserved group in traditional finance and credit scoring systems (scorecard approach) by lessening the credit constraint hence enabling them to venture into business. It is supported by the research which indicated that digital finance's positive significant effect on entrepreneurship is high among rural residents compared to urban residents as the latter already have access to the fund (Zhang et al., 2020). It is opined that in the application of big data analytics and machine learning, technology companies can collect data through the existing customer networks instantly and leverage the technologies to deliver a brand-new creditworthiness assessments model. It is also believed that the new credit evaluation system would enable the financial institutions to make a more accurate decision on approving the credit and have better control in risk management (reducing credit losses) (Mehdi et al., 2019).

Biometrics plays the role of providing a relatively secure environment and breaking the barriers of the excluded groups. According to Visa (2019), biometrics refers to the unique, intrinsic characteristics that can be used to identify or verify an individual's identity. The prevalence of fingerprint and facial recognition technologies has dramatically impacted individual norms. The most significant contribution of Biometrics is to enhance security through identification and authentication. Biometrics could assist the excluded groups, especially the uneducated and disabled people, use financial products (Patel, 2018). This is due to the use of Biometrics like fingerprints in financial transactions has simplified the entire process and writing processes such as inserting the passwords or PINs are eliminated. Nevertheless, it solves the financial accessibility of excluded groups who lack adequate government identification credentials. Unfortunately, this study could not find the data of number of people in China that do not have basic ID credentials, however, the fact that around one billion people around the world are still without ID credentials (World Bank, 2019) has sufficiently shown that how technology has decreased the threshold of financial inclusion for these groups. It is believed the incidents might also happen to the remote and rural villages in provinces such as Henan, Shandong, Sichuan, Guangdong and Hebei. Biometric identification overcomes the challenges of traditional identification in banking sectors, individuals that lack identification credentials in opening the formal bank accounts could benefit from the non-bank financial service providers such as Alipay and WeChat pay to meet basic financial needs. Biometrics technologies play the role in filling the gaps for the excluded group in identity authentication whereby populations with low educational levels or disabled could enjoy using financial products easily once they have set up their Biometrics and the security of Biometrics is promising as it is uniquely personal and it is almost impossible to replicate.

Based on the discussion above, it is opined that the government played the enabler role in issuing policies that assist the promotion of financial inclusion while innovative technologies act as supporters and facilitators in the journey.

CONCLUSION

Throughout the discussion above, it is noted that the technologies have significantly contributed to China's financial inclusion through innovative technologies. Internet plays the role of enabler in digital financial inclusion and stimulates local innovative financial products

development; Big data analytics and machine learning, supporter of financial inclusion through new credit evaluation system which lowered down the threshold in credit access and loan taking; Biometrics bridging the gap for vulnerable groups such as low-educational groups and disabled in accessing the basic financial services in a convenient and fast manner. Although these innovative technologies are seemingly contributing to the promotion of financial inclusion, they possess a higher risk of rising societal issues such as fraud and unethical practices (naked loans), if the issues remain unsolved, eventually, the sustainable growth of financial inclusion would be affected. It requires the cooperation between government authorities, financial institutions, technologies companies and fintech startups to work hand in hand in improving the overall financial infrastructure, financial literacy, financial products' quality, and business ethics to achieve sustainable financial inclusion in China. This study is limited to fewer technologies such as the Internet, big data, machine learning, and Biometrics due to the insufficiency of research in this topic area in China. Future researchers could probably study more on Regulatory Technology (RegTech) and Block-Chain Technology in mitigating financial risks and uncertainties. Direction on the Digital Yuan, which integrates Blockchain technologies and Biometrics, is encouraged to continually evaluate how innovative technologies play a game-changing role in China's future financial inclusion.

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FACTORS INFLUENCE STUDENTS' ONLINE LEARNING CONTINUANCE INTENTION BY SEM AND FSQCA BASED ON EXTENDING ISS MODEL

Liao Wenguo[1*]
Advisor: Assoc.Prof.Dr. KunchareeKakhai,Dr. Jiraphon Sawasdiruk
[1*] *Suan Sunandha Rajabhat University, Dusit, Bangkok, Thailand,*
E-mail: 116634665@qq.com

ABSTRACT

The purpose of this study was to examine students continuance intention on online learning in Western University of China. This research build a conceptual framework based on Information System Success Model(ISSM) to studied the relationship of between system quality, information quality, service quality, online classroom atmosphere self-efficacy, satisfaction and continuance intention. Based on pragmatism philosophy, mixed research methods are used and Explanatory Sequential Mixed Methods Design is carried out. In the stage of quantitative data analysis, about 300-500 questionnaires were collected from college students in Western University of China who have participated in online learning, and then the conceptual model was validated using Amos and FSQCA analysis data. In the quantitative analysis stage, data will be collected from about 20 samples from people with knowledge and work experience related to professional teaching administrators from Chinese universities, front-line teachers and some students who have participated in online learning through structured interviews, and then NVivo software was used to analyze the data to further explain the conceptual model.

Keywords: Online Learning, E-Learning, ISSM, System Quality, Information Quality, Service Quality, Online Classroom Atmosphere, Self-Efficacy, Satisfaction, Continuance Intention

INTRODUCTION

Problem Statement

During the lock-in period of COVID-19, online learning (or e-learning) received more and more attention. The extensive development of online learning in COVID-19 has provided objective conditions for the transformation of teaching mode from traditional learning to e-learning paradigm(Singh & Tewari, 2021). It promotes students' learning and well-being by providing online learning resource sharing on the Internet. However, in many countries, e-learning is not fully utilized, which will lead to waste of resources and widespread failure of e-learning systems. Therefore, improving learners' sustained willingness to learn online is a major challenge facing many universities(Alqahtani & Rajkhan, 2020). Students' attitudes towards online learning and their learning interests should be fully considered to ensure sustainable online learning(Chu et al., 2021).

Online learning provides distance education through technical platforms. It has also been recognized as other comparable terms, such as "distance learning", "E-Learning" and "blended learning". The online learning framework is considered to be composed of six dimensions, including users / learners, lecturers, teaching methods, technology, design and environment(Aldhafeeri & Khan, 2016). Information system theory determines the technical factors of online learning framework ISS includes system quality, information quality and service quality in the conceptual model as exogenous variables to predict online learning satisfaction and sustainability.

Online classroom atmosphere refers to the degree of students' support and cooperation in the classroom. It is defined as students' perception of the supportive and cooperative communication environment in the classroom (Dwyer et al., 2004). So online classroom atmosphere determines the environment, interaction factors of online learning framework. The most commonly accepted and recognized types of interaction are learner –learner, learner-instructor and learner-content interaction(Bağrıacık Yılmaz & Karataş, 2018). Positive classroom atmosphere has a positive impact on students' participation in classroom teaching(Sidelinger & Booth-Butterfield, 2010).

Learning theory defines how individuals acquire and retain knowledge to improve their own abilities. Learners' self-efficacy is regarded as the core element of learning theory. Self efficacy is defined as how one believes that he or she will complete the task until they reach the result. So self efficacy determines learner own factors of online learning framework.

This study extends the previous research from two aspects. First, we developed an updated D & M ISS model, although it is still limited to assessing the success of information systems. In the past, some scholars used ISS model to evaluate the use of e-learning, but paid more attention to technical factors such as system and information quality, such as (Al-Fraihat et al., 2020), Yakubu and (2018) and(Safsouf et al., 2019). Rokhman(2022a) pays attention to the role of students' ability to use the system, teachers' teaching ability and teachers' social environment in the online learning system. But it extends the updated D & M ISS model from the online course atmosphere and students' self-efficacy. The online course atmosphere dimension comprehensively considers the measurement indicators such as student cooperation and teacher-student interaction. Secondly, the possibility of continuous reuse of e-learning is also studied. Because online learning should become a way to supplement traditional learning methods in the post epidemic period. Some educational regulators plan to continue to use e-learning after the end of the epidemic (bramasta, 2020).

The findings of the analysis would definitely answer the research questions as follows:

1.To verify whether the system quality, information quality and service quality of the ISSM model affect the satisfaction and sustainability of online learning in the context of Chinese universities.

2.Both online classroom atmosphere and learning self-efficacy extend the ISSM model to confirm whether these two dimensions can affect students' online learning satisfaction and willingness to continue

LITERATURE REVIEW

1. To determine the relationship between information system factors(Information quality, system quality, service quality) and the satisfaction of online learning.

2. To determine the relationship between classroom atmosphere and satisfaction of online learning

3. To determine the relationship between self-efficacy and satisfaction of online learning.

4. To determine relation Gender/ subject to moderate the information quality, system quality, service quality classroom atmosphere and self-efficacy on the satisfaction.

Research Hypothesis

H1: System quality will positively influence online learning satisfaction.

H2: Information quality will positively influence online learning satisfaction.

H3: Service quality will positively influence online learning satisfaction.

H4: Positive classroom atmosphere positively affects students' online learning satisfaction.

H5: Self-efficacy positively affects students' online learning satisfaction.

H6: Satisfaction will positively influence on students continued intention of online learning.

Research Scope

1. **The research population scope**

   Population

   Students in Western University of China who have participated in online learning.

   Sampling

   In order to mitigate sample selection bias, stratified sampling method is adopted as representative random sampling and questionnaire based on gender ratio and discipline distribution. A total of over 300 samples were selected from college students in Western University of China. The ratio of men and women is about 1:1, and that of science and engineering, sociology and art is about 1:1:1.

2. **The research area scope**

   Universities in Western China

3. **The research contents scope**

   Independent Variable

   Variable : System quality（SQ）

   System quality is measured by function, ease of use, reliability, information quality, flexibility, portability and integration(DeLone & McLean, 2003).

   Variable : Information quality(IQ)

   The quality of the output of e-learning and is identified as the extent to which teachers think that using this information can improve their performance(Ayu Paramadini & Suzianti, 2021).

   Variable :Service quality(SQL)

   Service quality is the overall support for learners to perceive the e-learning system(Chiu et al., 2007).

   Variable: classroom atmosphere(CA)

   Online classroom atmosphere is defined as students' perception of the supportive and cooperative communication environment in the classroom(Dwyer et al., 2004).

   Variable: self-efficacy(SF)

   Self efficacy is regarded as this belief, which is often used to explain the behavior of individuals(Lent et al., 2014).

   Dependent Variable

   Variable: Satisfaction(SF)

   User satisfaction refers to the degree to which consumers think the system is useful and want to use the system again(Xinli, 2015).

   Variable: Continuance Intention(CI)

   In the context of online learning, continuous intention to use is defined as the possibility of learners using the system again after using the system(Budu et al., 2018).

4. **The research period scope**

   From April 2023 to June 2023

Research Definitions

Online learning: For the current study purpose, we operationally defined e-learning in high-education institutions as a type of distance learning that uses the Internet technology to interact with remote learners and deliver educational material electronically to support students and universities goals and enhance knowledge transfer.

Information system:

Online learning system(e-learning system): Online learning system is supposedly the most prevalent Internet based learning setting which aids in efficient time usage and boundary less learning. Online learning system users can access the system through an Internet portal and benefit from information, lessons learned, knowledge and skills. E-learners can access the course directly (on-site) or through the content uploaded and published on the portal(Al-shargabi et al., 2021).

The expected benefits of research

Academic benefits…

This study adds two dimensions of online classroom learning atmosphere and self-efficacy, expanding Delone and Mclean's successful information system model. It has also invested in a new background and environment, that is, online learning in universities in China.

Policy benefits.

The results can be used as a reference for colleges and universities in China to implement online learning systems, so as to improve the use of information technology, and let senior managers of colleges and universities help them identify important factors that affect the implementation of online learning. At the same time, it also provides reference for front-line teaching staff to improve the online teaching effect.

Students generally agree that online learning can help enhance knowledge acquisition, save resources, and improve efficiency. University administrators should recognize the importance of online learning, encourage and support students to use online learning. Higher education in China should formulate an effective plan for successful implementation, pay attention to the impact of innovative technology on solving various problems faced by higher education, and provide substantive encouragement in the implementation process

LITERATURE REVIEW

Theory

Information System Success Model

Delone and McLean (1992) proposed the Information System Success Model(ISSM) to analyze the success or failure in implementing the Information System. Delone & McLean adopted some suggestions put forward by scholars and updated and reorganized the old model.

The modified model points out that three quality indicators (system, information, and service) affect user satisfaction, intention to use, use and further influencing the net benefits of the entire information system(DeLone & McLean, 2016).

Due to the complexity of "use", scholars often study "intention to use" instead. The positive experience of use increases user satisfaction and further promotes the intention to use. The model is tested in many situations such as digital libraries(Xu & Du, 2018),e-learning Course Management Systems(K. Kim et al., 2012) and e-learning system (Cheng, 2012). The main goal of establishing online learning in universities is to accept E-Learning based on students' positive attitude and willingness. The ISSM extension model proposed in this paper studies the impact of

system quality, information quality and service quality on students' online learning satisfaction, and then affects students' willingness to continue online learning.

Variable 1:System quality

System quality is measured by function, ease of use, reliability, information quality, flexibility, portability and integration(DeLone & McLean, 2003). System quality is learners' belief in online learning performance characteristics(Chiu et al., 2007). System quality factor is used to measure the reliability and accessibility of e-learning system. The system quality helps to improve users' trust and satisfaction with the system(S. Kim & Park, 2019).It has a strong positive impact on learners' satisfaction(Ozkan & Koseler, 2009).

Variable 2:Information quality

The quality of information can be measured by the integrity, consistency, accuracy, relevance, comprehensibility, and timeline of course materials(Chiu et al., 2007; DeLone & McLean, 2003). Information quality includes course content, course quality and course flexibility(P.-C. Sun et al., 2008). The information quality also improves the system utilization rate and increases the willingness of users to use the e-learning system. In addition, accurate content and timely response improve user satisfaction(Lee & Quek, 2018). Information quality has a strong positive impact on learners' satisfaction(Ozkan & Koseler, 2009).

Variable 3:Service quality

Service quality is the overall support for learners to perceive the e-learning system(Chiu et al., 2007).

E-learning system provides reliable services to improve the service quality of the system. By measuring the gap between learners' expectations and experiences, and learners' feedback, it can provide better services(Vanitha & Alathur, 2021).Research shows that service quality has an impact on the satisfaction of users or customers(Ozkan & Koseler, 2009).

Variable 4:Online classroom atmosphere

Online classroom atmosphere is defined as students' perception of the supportive and cooperative communication environment in the classroom(Dwyer et al., 2004). An interconnected classroom atmosphere reflects a strong intra group bond that enables students to express themselves in communicating with others. Some studies show that a positive classroom atmosphere is beneficial to students and positively affects students' participation in classroom teaching(Sidelinger & Booth-Butterfield, 2010; MacLeod et al., 2018). Classroom atmosphere affects students' subjective environmental cognition, and then affects their academic performance(Yu et al., 2013).A positive classroom atmosphere supports students' participation in classroom activities, helps students meet their psychological needs and cultivate their motivation for autonomous learning(Y. Li & Zhao, 2021).

Combined with the above research results, a good classroom atmosphere can enable students to participate in classroom more actively, quickly enter the classroom learning state, then improve learning satisfaction and finally achieve high-level learning results.

Variable 5:self-efficacy

Scholars believe that the results of individual behavior are not only affected by environmental factors, but also by the personal factors that lead to success(van Dinther et al., 2011). Self efficacy is regarded as this belief, which is often used to explain the behavior of individuals(Lent et al., 2014).

Variable 6:Satisfaction

User satisfaction has been widely used in the field of information systems, and is considered as one of the basic determinants to evaluate the success or failure of new systems(Montesdioca & Maçada, 2015). User satisfaction refers to the degree to which consumers think the system is useful and want to use the system again(Xinli, 2015).

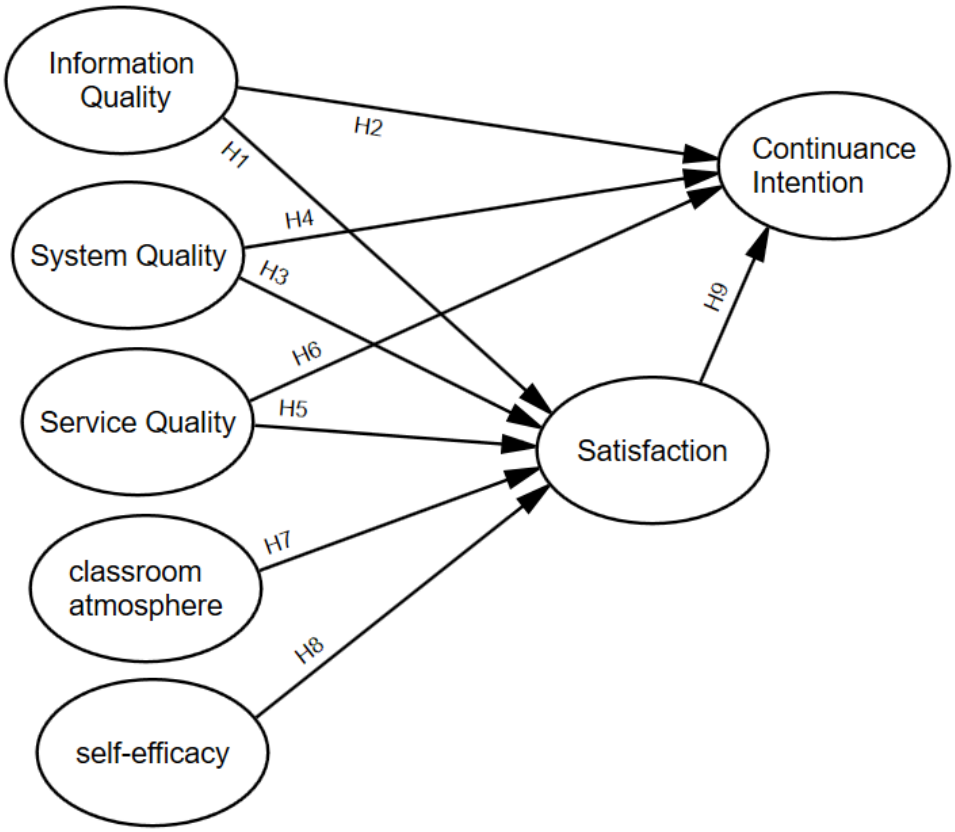
Continuance Intention

Behavioral intention is defined as the extent to which an individual intends to perform certain future behaviors(Davis & Warshaw, 1992). In the context of online learning, continuous

intention to use is defined as the possibility of learners using the system again after using the system(Budu et al., 2018). Whether learners continue to be willing to system determines the key factor of the success of any e-learning system. Therefore, it is very important to study the factors that affect the intention of sustained behavior(Budu et al., 2018).

Conceptual Framework

For this study, the assumed variable factors and their relationships in the framework are obtained from the existing work of the models and assumptions recommended in the above studies. The recommended extended framework is shown in Figure 1. There are six hypothesis tests to verify that system quality, service quality, information quality, online classroom atmosphere and self-efficacy affect user satisfaction and willingness to continue using.



METHODOLOGY

This study uses mixed research (Mixed Method) "Explanatory Sequential Mixed Methods Design". The explanatory sequential mixed methods approach is a design in mixed methods that appeals to individuals with a strong quantitative background or from fields relatively new to qualitative approaches. It involves a two-phase data collection project in which the researcher collects quantitative data in the first phase, analyzes the results, and then uses the results to plan (or build on to) the second, qualitative phase. The quantitative results typically inform the types of participants to be purposefully selected for the qualitative phase and the types of questions that will be asked of the participants. The overall intent of this design is to have the qualitative data

help explain in more detail the initial quantitative results, thus it is important to tie together or to connect the quantitative results to the qualitative data collection. A typical procedure might involve collecting survey data in the first phase, analyzing the data, and then following up with qualitative interviews to help explain confusing, contradictory, or unusual survey responses.

1. **Research Design**

This research is mixed research between quantitative research and qualitative research which can be described as follows:

1. Quantitative research, the researcher conducted data collection by using questionnaires on **system quality** (Variable1), **information quality** (Variable 2), **service quality** (Variable3), **online classroom atmosphere** (Variable4) , **self-efficacy(**Variable5) , **satisfaction**(Variable6) and **continuance Intention** (Variable7) in order to use the collected data to analyze the Structural Equation Modeling: SEM) and statistical data analysis using smart-pls.
2. Qualitative research, the researcher collected data using the In-Depth Interview method. The population and the sample that the researcher has visited the area for In-Depth Interview with Purposive Sampling to take the results from the field visit to analyze and develop a model of causal factors influencing **questionnaires on r system quality** (Variable1), **information quality** (Variable 2), **service quality** (Variable3), **online classroom atmosphere** (Variable4) , **self-efficacy(**Variable5) , **satisfaction**(Variable6) affecting college student **continuance Intention (Variable7)** (Dependent Variable) on online learning in Western University of China to confirm how appropriate and consistent variables and factors.

The variable factors were gauged by employing the seven-point Likert scale, with 7 being "strongly agree" and 1 being "strongly disagree", The items were first translated into Chinese by two information management professors and then translated back into English by another translator with special training in English-Chinese translation. The translation into Chinese ensured that the respondents could read the items with no difficulty when the questionnaires were administered in China. One professional translator performed a backtranslation to ensure that the original translation was content accurate.

2. **Population and sample**

Population

Students in Western University of China who have participated in online learning.

Sample

Samples used in quantitative research are students in Western University of China who have participated in online learning. In order to mitigate sample selection bias, stratified sampling method is adopted as representative random sampling and questionnaire based on gender ratio and discipline distribution. According to the rule of 10 samples for each indicator, there are 28 indicators in total, and at least 280 samples are required(Chin, 1998). At least 300 samples are required below seven constructs(Hair Jr, n.d.). A total of about 300-500 samples were collected. The ratio of men and women is about 1:1, and that of science and engineering, sociology and arts & sports is about 1:1:1. The respondents in the research indicated their intention to participate in this study and completed the questionnaire voluntarily. All the respondents were anonymous and agreed to participate in the survey of this study in order to collect data. When conducting the online survey, we explained the confidentiality of the survey process. None of the questions involved confidential information, and individual respondents completed the survey anonymously. Therefore, all the respondents were voluntary, and their personal information and opinions were confidential and did not relate to any sensitive issues.

Samples used in qualitative research 20 people were selected by purposive sampling. The selection criteria were those from people with knowledge and work experience related to professional teaching administrators from Chinese universities, front-line teachers and some

students who have participated in online learning..

3. Procedures for conducting research

Procedures for conducting research the researcher used a method to collect information from participants Who are Chinese college students participated in online learning Chinese people who can speak Chinese which has the following process:

Step 1 The study of concepts, theories, and literature reviews related to secondary sources were studied and researched from books, textbooks, journals, research documents, and electronic documents both domestically and internationally. To enable researchers to acquire basic research knowledge and to develop and formulate a research concept with a literature review to identify relevant variables from online databases to define research concepts.

Step 2 Create a research tool is a questionnaire in which the researcher completes a research questionnaire based on the study of concepts, theories, and literature reviews obtained from secondary sources. The content and details are detailed in the chapter 2. This conceptual framework consists of questions in the questionnaire consisting of the following variables: syst**em quality** (Variable1), **information quality** (Variable 2), **service quality** (Variable3), **online classroom atmosphere** (Variable4) **self-efficacy(**Variable5) , **satisfaction**(Variable6) and **continuance Intention** (Variable7)

Step 3: Qualitative Research with in-depth interviews by defining the target population and sample groups. The researcher conducted an In-Depth Interview by random sampling and interviewing a sample of 20 people. Interviewees include professional teaching administrators from Chinese universities, front-line teachers and some students who have participated in online learning. Results obtained through in-depth interviews to analyze the influence of information quality/ system quality/ service quality/classroom atmosphere/self-efficacy/satisfaction to continuance intention of online learning to how appropriate and consistent in the Chinese context? And the obtained results were analyzed as a model for the structure of the variables to create a questionnaire tool in a quantitative research study.

Step 4 Validity testing of the instrument used in the research study. The researcher created a questionnaire tool from the synthesis and development of questions from the relevant literature review. As for testing the quality of research tools, the researcher tested the validity by bringing the questionnaire developed by the researcher to the experts and thesis advisors to check the quality of the content validity by 5 experts to determine the Index of Item Objective Congruence (IOC) of the research that wants to measure all questionnaires with an IOC value greater than 0.50 means that all questions must match the principle. The research objectives and if the IOC value is greater than 0.50 means that the questions do not match the research objectives. The researcher must update the questions of the new research to match the principles or objectives of this research.

Step 5 The investigator conducted confidence or internal concordance with Cronbach's Alpha Coefficient by using the questionnaire to perform the revisions as recommended by experts with 30 samples of Chinese college students participating in online learning, not the actual sample in the research. The selection of questions with an α value of 0.70 or higher is considered confidential.

Step 6 Quantitative Data Analysis in this stage, the research study was conducted in the form of survey research by collecting questionnaires from a sample of Chinese college students participating in online learning. Data analysis uses statistical techniques such as descriptive statistics and inferential statistics by evaluating measurement models to determine the validity of variables and examining linear structural relationships and Structural Equation Modeling (SEM). Then use fs-QCA to analyze the core and marginal conditions that affect online learning willingness

Step 7 Apply the results of the quantitative analysis summarized into a statistical model and an in-depth interview to confirm the model and use it for discussion.

Step 8 Conclusion, discussion results, and research recommendations are steps in which the

researcher can summarize and explain the main content provided that it covers the objectives of the research study.

4. Research Instrument (Tools)

The instrument used in this research was a questionnaire for data collection. To create the tools of this research, the researcher has studied concepts, and theories and reviewed relevant literature from domestic and foreign countries. The tools used in this research consisted of 8 parts as follows:

Part 1 The survey form was a question about the personal characteristics of the Chinese respondents or students regarding gender, age, educational level, subject, etc., The statistical analysis uses the percentage.

Part 2 Rating Scale is a question to ask for opinions on syst**em quality** (Variable 1). It is a question that is an estimator on the 7-level statistical opinion level (Rating Scale) according to (Brown, 2011; Dolan, 1994; Olsson, 1979) . In the case where the respondents had the most opinions with the highest to the lowest level of agreement, 7 levels, 5 items

Syst**em quality** (Variable1), **information quality** (Variable 2), **service quality** (Variable3), **online classroom atmosphere** (Variable4) **self-efficacy(**Variable5) , **satisfaction**(Variable6) and **continuance Intention** (Variable7)

Part 3 Estimation is a question to ask for opinions about the **information quality**(Variable 2) is a question that is an estimation on the 7-level statistical rating scale according to the concept of Likert, (1961). In the case where the respondents had the most opinions with the highest to the lowest level of agreement, 7 levels, 4 items

Part 4: Estimation is a question to ask for opinions about Service quality (Variable 3). It is a question that is an estimation of 7 statistical rating scales according to (Brown, 2011; Dolan, 1994; Olsson, 1979). The survey respondents had the highest level of opinion with the highest to the lowest level of agree, 7 levels, 4 items.

Part 5 Estimation is a question to ask opinions about classroom atmosphere (Variable 4), a question that is a measure of the rating scale of 7tatistical rating scale according to (Brown, 2011; Dolan, 1994; Olsson, 1979).The case of the respondents with the highest level .of opinion with the highest to the lowest level of agree, 7 levels, 5 items..

Part 6 Estimation is a question to ask opinions about self-efficacy (Variable 5), a question that is a measure of the rating scale of 5 statistical rating scale according to (Brown, 2011; Dolan, 1994; Olsson, 1979).The case of the respondents with the highest level .of opinion with the highest to the lowest level of agree, 7 levels, 4 items..

Part 7 Estimation is a question to ask opinions about Satisfaction (Variable 6), a question that is a measure of the rating scale of 5 statistical rating scale according to (Brown, 2011; Dolan, 1994; Olsson, 1979).The case of the respondents with the highest level .of opinion with the highest to the lowest level of agree, 7 levels, 5 items..

Part 8 Estimation is a question to ask opinions about continuance intention (Variable 7), a question that is a measure of the rating scale of 5 statistical rating scale according to (Brown, 2011; Dolan, 1994; Olsson, 1979).The case of the respondents with the highest level .of opinion with the highest to the lowest level of agree, 7 levels, 5 items..

Instrument	Items
System quality(SYQ)	SYQ1:Online learning platform system is reliable. (Gu et al., 2021) SYQ2:Online learning platform system is flexible (user-friendly). (Gu et al., 2021) SYQ3:Online learning platform system allows information to be readily accessible to me. (Gu et al., 2021)

Instrument	Items
	SYQ4: Online learning platform system is essay to use. (Chiu et al., 2007)
	SYQ5: Online learning platform system quickly (upload/download) all the text and graphics. (Chiu et al., 2007)
Information quality(IQ)	IQ1:Online learning platform provides accurate information. (Gu et al., 2021)
	IQ2:Online learning platform provides clear information. (Gu et al., 2021)
	IQ3:Online learning platform provides relevant information. (Gu et al., 2021)
	IQ4:Online learning platform provides up-to-date information. (Gu et al., 2021)
Service quality(SEQ)	SEQ1:Online learning platform provides prompt responses to my request. (Gu et al., 2021)
	SEQ2:Online learning platform provides right solution to my request. (Gu et al., 2021)
	SEQ3:The service provided in online learning platform attends to individual's personalized needs. (Gu et al., 2021)
	SEQ4:The service provided in online learning platform is reliable. (Gu et al., 2021)
	SEQ5:I feel comfortable using the functions and services provided by e-learning site. (Chiu et al., 2007)
Classroom atmosphere (CA)	CA1:In online education, many students are participating in the interaction in class.(H.-L. Sun et al., 2022)
	CA2:I have participated in many teacher–student interaction courses in online education. (H.-L. Sun et al., 2022)
	CA3:Teachers in online education provide many opportunities for interaction. (H.-L. Sun et al., 2022)
	CA4:The forms of teacher–student interaction in online education have become diverse. (H.-L. Sun et al., 2022)
	CA5:The timeliness of teacher–student interaction in online education has been improved. (H.-L. Sun et al., 2022)
Self-efficacy(SE)	SE1:In the course of online learning, I am competent to solve the problems of e-learning.
	SE2:In the course of online learning, when I come across problems, I can find solutions to them.
	SE3:I will try my best to achieve the online learning targets set by myself.
	SE4:I am well prepared to face and handle the demands of e-learning
Satisfaction(SF)	SF1:I am extremely pleased with the online learning platform. (Gu et al., 2021)
	SF2:I am extremely contented with the online learning platform. (Gu et al., 2021)
	SF3:I am extremely satisfied with the online learning platform. (Gu et al., 2021)
	SF4:I am absolutely delighted with the online learning platform. (Gu et al., 2021)
	SF5:I think the course assessment method of the online learning platform is very reasonable.(A. Li et al., 2021)
Continuance	CI1:I intend to continue to use the online learning platform for

Instrument	Items
intention(CQ)	assisting classroom learning.(Y. Li & Zhao, 2021) CI2:I intend to continue to use the online learning platform for enriching my knowledge(Y. Li & Zhao, 2021). CI3:I will continue using the online learning platform increasingly in the future . (Y. Li & Zhao, 2021) CI4 I will recommend other people to use the online learning platform. (Y. Li & Zhao, 2021) CI5 Overall, I intend to continue to use the online learning platform in the future. (Y. Li & Zhao, 2021)

5. Data Collection

1. Quantitative data collection

The respondents in the research indicated their intention to participate in this study and completed the questionnaire voluntarily. All the respondents were anonymous and agreed to participate in the survey of this study in order to collect data. The survey was conducted in Chinese. When conducting the online survey, we explained the confidentiality of the survey process. None of the questions involved confidential information, and individual respondents completed the survey anonymously. Therefore, all the respondents were voluntary and their personal information and opinions were confidential and did not relate to any sensitive issues.

2. Qualitative data collection

Qualitative data collection from the In-depth Interview The researcher determined the date, time, and place of the Key Informants interview. The researcher conducted an in-depth interview using a structured interview form as a tool to collect information from people with knowledge and work experience related to professional teaching administrators from Chinese universities, front-line teachers and some students who have participated in online learning.. The researcher used a purposive subjects with a duration of interviews between Nov-DEC 2022..

6. Statistics used in research

Statistics are used for data analysis when the researcher had already collected the data. The researcher has determined statistics that are appropriate and consistent with the statistical data to match scientific or social science principles in accordance with the research objectives set. The statistics used in the data analysis of the research consisted of four components as follows:

1. Statistics for descriptive analysis
2. Statistical analysis of the relationship between variables
3. Statistical analysis of the reliability of latent variables and the mean of extracted variances.
4. Statistical analysis of structural equation modeling

Before we use the SEM analysis to test the model, we need to carry out the CFA analysis. The purpose of the CFA analysis is to examine one-dimensionality of the research constructs. The factor loading of the observed variables measured for each latent variable and should be significant at the .050 level and higher than .700(Chin & Marcoulides, 1998).

The goal of measurement modeling was to assess the reliability and validity of the measurement scales. The reliability of the measurements was examined using composite reliability (CR) and Cronbach's Alpha. The critical values for CR and Cronbach's Alpha are 0.7 and 0.7(Fornell & Larcker, 1981). Then, confirmatory factor analysis was used to test the convergent validity and discriminant validity. Convergence validity reflects the correlation degree of the same latent variable, while discriminant validity reflects the difference between different latent variables. The convergent validity of the constructs was examined by average variance extracted (AVE) and item loading significance. The recommended value of AVE is 0.5(Fornell

& Larcker, 1981). If the result of consideration found that the research model and the empirical data (Model Fit) are inconsistent. The researcher must adjust the model and rework it until the empirical data research model is harmonious.

The second step is to examine the significances and strengths of each hypothesis and the variable explained to the dependent variable. This part applies to adopt AMOS software and structural equation model (SEM) to carry out the empirical examination of the hypothesis. First, the model's goodness of fit and overall explanatory power was considered. Goodness-of-fit analysis refers to how well a model fits a set of observations The fitting hypothesis model in this study was evaluated according to the regular fitting indexes provided by AMOS software,. The recommended values for the indexes are(Hooper et al., 2008):

$\chi 2$ /DF<3.0,GFI >0.9,AGFI>0.9,RMSEA<0.08,SRMR<0.08,CFI>0.9TLI(NNFI)>0.9.

The third step to evaluate the structural model is the determination coefficient of endogenous variables (R2). R2 measures explained variance to its total variance.(Chin, 1998b) considers values of approximately .670 substantial, values around .333 average, and values of .190 and lower weak.

The fouth step is to evaluate the significance of the path coefficient (Chin & Marcoulides, 1998).

5. Use multi group to compare whether there are differences in path systems under different genders and disciplines

6. Use FsQCA to analyze the core and marginal conditions that affect online persistence intention.

FsQCA is a new research tool first introduced by Ragin(2000), which is a case-based technique rather than variable-based analysis technique commonly used in MRA and SEM. The main aim of this technique is to identify all necessary and sufficient conditions leading to a specific outcome.

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