The Effects of Innovation Adoption and Social Factors between Sustainable Supply Chain Management Practices and Sustainable Firm Performance: A Moderated Mediation Model

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Abstract: The aim of this study was to develop higher-order scales for assessing sustainable supply chain management practices, innovation adoption, and sustainable firm performance in the restaurant sector. Three different higher-order scales were developed for assessing the SSCM, SFP and innovation adoption. The first scale for SSCM higher-order construct consisted of service–product supply chain management practices (SPSSCM), service–setting supply chain management practices (SSSSCM), and service–delivery supply chain management practices (SDSSCM). The second higher-order scale for sustainable firm performance (SFP) consisted of economic, operational, environmental, and socio-cultural performance. The third higher-order scale for innovation adoption (INNO) consisted of “product- and process-based innovation”, “marketing-based innovation”, “technology-based innovation” and “organizational innovation”. The face, content, construct, convergent, and discriminant validity was tested using pilot study, expert opinion, EFA, and CFA. With 178 responses collected from restaurateurs, managers, and supervisors of casual restaurants in Prachuap Khiri Khan province in Thailand, this study evaluates the direct effects of SSCM on SFP. It further evaluates the mediating role of innovation adoption between sustainable supply chain management practices and firm performance and the moderated mediation effects of socio-demographic factors such as age, gender, education, and experience. The results reveal that sustainable supply chain management practices can positively lead to sustainable firm performance. However, irrespective of the indirect effects of socio-demographic factors, adopting innovation completely mediates the relationship between sustainable supply chain management practices and firm performance.

Keywords: restaurant supply chain management practices; sustainable supply chain management practices; sustainable firm performance; innovation adoption; moderated mediation

1. Introduction

Sustainable supply chain management practices in the food and beverage service industry are important intangible strengths for the tourism supply chain of a destination. This is because the rapid growth of mass tourism since globalization, and its impacts on the host destination, has made sustainability a key area of study [1]. Furthermore, modern developments in theory and practice have indicated that sustainability should cover economic, operational, and environmental aspects, as well as society at large. Those aspects of sustainability are widely studied in the tourism and hospitality literature throughout its supply chain. However, due to the complex heterogeneous nature of the industry, the majority of studies in the first decade of the 21st century did not widely cover all industries, especially the food and beverage sector and their sustainable supply chain management practices in the tourism industry [2]. In any case, research related to supply chain management practices within the tourism and hospitality industry has gained more attention in the past decade. A handful of research on scale development for green supply chain management practices [3–5] and its causal relationship towards firm performance were
studied. Those research examining the causal relationship between green SCM practices and firm performance proved the positive effects. A few recent studies also highlighted the role of innovation adoption in firm performance [6–8]. However, to the best of the author’s knowledge, a holistic approach of covering sustainability dimensions in the SCM practices and performance, and the mediating role of innovation adoption, has not been proposed and investigated in the context of the restaurant industry since the beginning of the COVID-19 pandemic. This is particularly relevant in tourism-dependent countries such as Thailand, where a noticeable share of the food and beverage service sector work for the tourism market. Therefore, this study is novel and important in that it considers the role of sustainable supply chain management (SSCM) practices and innovation adoption, and their impacts on sustainable firm performance. Sustainable firm performance has been a central issue since the beginning of the COVID-19 pandemic. Further, within the tourism industry in Thailand, the food and beverage sector was one of the hardest hit sectors due to the COVID-19 pandemic, and it underwent drastic transformation pressure [9]. This is due to the fact that the sector is dominated by micro, small, and medium sized enterprises (MSMEs), and individual family-owned businesses. Thus, the moderated mediation effects of the socio-cultural factors were also included in this study. Hence, this study aims to develop and validate a scale for measuring sustainable supply chain management practices (SSCM) of the food and beverage service industry and further test its causal relationship towards sustainable firm performance (SFP). It also aims to examine the mediating role of innovation adoption (INNO) between the sustainable supply chain management practices and sustainable firm performance. Moreover, since this study aims to focus on the food and beverage sector, which is mainly dominated by MSMEs and family-owned business, it also aims to study the moderated mediation effects of socio-cultural factors such as age, gender, education, and experience. Thus, the objectives of this research are to:

1. Review and identify the variables, develop the constructs, and propose the scale for assessing SSCM, SFP and INNO.
2. Test the scale for validity and reliability.
3. Investigate the causal effects of SSCM on SFP.
4. Examine the moderating effects of INNO between SSCM and SFP.
5. Examine the moderated mediating effects of socio-cultural factors such as age, gender, education, and experience in the causal relationship between SSCM, INNO, and SFP.

The theoretical background of the constructs and their causal relationship, as per the conceptual diagram in Figure 1, are presented in the next section. Further, hypothesis development, research methodology, data analysis, interpretation, findings, discussion, implications (theoretical, entrepreneurial and managerial, and social), limitations, directions for future research, and concluding remarks are presented in the following sections.

![Theoretical Framework](image-url)

**Figure 1.** Theoretical Framework. (SSCM—sustainable supply chain management practices, INNO—innovation, SFP—sustainable firm performance, SCL—socio-cultural factors).
2. The Theoretical Background of SSCM, INNO, and SFP

2.1. Sustainable Supply Chain Management Practices (SSCM)

Constructs on measuring sustainable supply chain management practices are largely motivated by the “Triple Bottom Line” [10] model. Among those, a large pool of research is focused on structured manufacturing industries and only a limited number of studies are published in tourism sectors [11]. Even among those studies, a majority of studies within the culinary tourism supply chain represent the “demand chain management” of the “supply chain management” such as sales and marketing [12]. This is because the demand side [13] of the tourism supply chain is driven by commitment, coordination, and cooperation between the tourism stakeholders. On the other hand, even though local restaurants and food are integral and inevitable elements of a destination, its supply chain has received less attention among researchers due to its complex nature of serving both locals and tourists. Still, it gained noticeable attention from the perspectives of the culinary tourism supply chain. Smith and Xiao [14] introduced supply chain theory in the culinary tourism supply chain and found that farmer markets (local suppliers) and restaurants are an integral part of the tourism supply chain. However, restaurants are unique in the service–product continuum [15,16] of tourism. If we consider online travel agencies as a pure service provider, and souvenir manufacturers as a pure product providers, then fine dining restaurants, casual restaurants, fast food outlets, bars, and cafes exist in the middle of the service–product continuum. A conceptual tourism service–product continuum is provided in Figure 2. This means that the food and beverage service industry is a mix of both product and service. Therefore, assessing its supply chain management practices entirely through either service supply chain constructs or product supply chain constructs may not be an appropriate approach. Hence, the most appropriate approach is to break down the supply chain management practices based on Bruce Laval’s “Guestology”, which encompasses aspects of service–product, service–setting and service–delivery systems (3S) [17,18], and adopt a similar approach to that of Wang et al. [5] in order to integrate sustainable supply chain management practices. The suitability of the 3S framework for assessing small-scale restaurants was already tested and found suitable [19]. Hence, this research coins the terms service–product supply chain management practices (SPSSCM), service–setting supply chain management practices (SSSSCM), and service–delivery supply chain management practices (SDSSCM); their constructs are explained in the next section.

2.1.1. Service–Product Supply Chain Management Practices (SPSSCM)

The service–product is the complete package of product and service components that attracts customers to a restaurant. The most recognised supply chain management practice in this domain is the supplier relationship, which entails coordination for the smooth flow of raw materials, information, and financial transactions [20]. Piboonrungroj [21] studied the supply chain management practices of the hotel industry by analyzing the transaction costs involved in the relationship between hotels and their food and beverage suppliers, and found that trust and coordination can reduce the transaction costs of the tourism supply chain. Therefore, the supply chain management practice of close coordination between tier one and tier two service providers is one of the most important factors for improving firm performance. Hence, this research framed the first three variables of the construct as “Establishing close business relationships with fresh perishable raw material suppliers (fresh seafood, meat, vegetables, fruits, and dairy products from the market) for the smooth flow of raw materials, information, and financial transactions.”, “Establishing close business relationships with frozen/processed perishable raw material suppliers (frozen seafood, frozen meat, fish balls, etc.) for the smooth flow of raw materials, information, and financial transactions.”, and “Establishing close business relationships with non-perishable raw material suppliers (rice, oil, fish sauce, other spices and condiments) for the smooth flow of raw materials, information, and financial transactions.” Menu value engineering [22–24] is one of the oldest concepts in increasing the sustainability of restaurant operations. The evolution of the food processing industry and modern restaurant business operations has
influenced the adoption of value-engineered raw materials through the food processing industry. In modern restaurant operations, several ingredients in casual dining restaurants are not prepared by the chefs from scratch (e.g., soya sauce, fish sauce, fish balls, fish cakes, crab sticks, sausages, and so on). Rather, they are processed and produced in the food processing factories and supplied either directly or through suppliers/retail outlets. Such value engineering at the “tier two tourism supply chain” [21] has several economic, environmental and socio-cultural advantages. However, the success of the food processing industry’s role in promoting the sustainability of the restaurant supply chain depends on support from restaurateurs. Hence, this research framed the fourth variable of the construct as “Encouraging suppliers to do value engineering to reduce economic, environmental, and socio-cultural costs.” The results of the study by Marx-Pienaar et al., [25] on the food service supply chain’s environmental sustainability, revealed the importance of raw material packaging. The ability of primary packaging can be assessed through its performance in ensuring the food product quality and the secondary packaging can be assessed through its ability to maintain that quality during storage and distribution. Hence, this research framed the fifth and sixth variables of the constructs as “The ability of the supplier’s primary packaging of raw materials to ensure food product quality.” and “The ability of the supplier’s secondary packaging of raw materials to ensure the good protection of raw materials during storage and distribution.” Additionally, such packaging materials are the most prominently accumulated waste in the food and beverage sector [26] so the packaging materials must be eco-friendly through either recyclability, reusability, or ease in disposing of them separately. Hence, the seventh variable of the construct was framed as “The packaging waste of raw materials are either recyclable, reusable, or easy to dispose of.” Restaurant supply chains are bi-directional [27] in nature. Hence, effective communication between the restaurant and its suppliers regarding customer expectations and feedback, and the ability of the supplier to listen and respond accordingly, is one of the core attributes of the bi-directional supply chain. Therefore, this research framed the eighth variable of the construct as “Frequent communication with suppliers about consumer expectations and feedback.” [28]. The tier two supply chain selection and their cost saving initiatives and pricing against the market [20,28] act as pillars for the supply chain and support the restaurant’s competitiveness in the market. Thus, the ninth variable of the construct was framed as “Suppliers offering cost-saving plans.” Procuring organic raw materials is one of the key advantages for menu planning, pricing, branding, and positioning the restaurant in the market [5]. We framed the tenth variable of the construct as “Suppliers offer choices of organic raw materials.” Food waste in restaurants is unavoidable and can occur due to various reasons. However, it can be reduced through proper awareness and knowledge [25]. So, the eleventh variable of the construct was framed as “Aware of sustainably handling waste from raw materials, packaging, and food waste.” Beyond all these, a systematic approach or practice throughout the business process may help restaurateurs to manage the sustainable supply chain management practices, from procurement to waste management. Hence, the final variable of the construct in the service product supply chain management practice was framed as “Following either our own- or third-party standard operating procedures for buying, procuring, receiving, and storing raw materials.” Altogether, the service–product supply chain management practices construct had twelve independent variables.
2.1.2. Service–Setting Supply Chain Management Practices (SSSSCM)

The term service setting [17] refers to the theme or environment of the restaurant. It includes everything from the kitchen equipment to cutlery, crockery, and other service equipment used in the restaurant, and is the second most crucial element in the success of a restaurant business. LPG-powered cooking ranges and other electric-powered kitchen equipment are the heart of the restaurant operation. Accordingly, the maintenance and repairability of those pieces of equipment are the top priorities of restaurateurs and managers [29]. Therefore, the first variable of the construct was framed as “All the kitchen and service equipment we use is eco-friendly. Our equipment is easy to maintain and can be either repaired or recycled easily.” The structural and operational flexibility [30–33] of a restaurant is another aspect that can support sustainability. Hence, “suitability of service setting for offering a range of services (for example: dining-in, party orders, outdoor services, etc.)” was included as the second variable of the construct. However, offering a range of services may also require the availability of additional resources such as equipment and manpower. Therefore, “Service capacity flexibility: we can rent extra equipment and recruit an extra workforce to handle high demand.” was included as the third variable of the construct. Disposable cutlery, crockery, and straws have become a concerning aspect of global pollution in the 21st century because they end up in landfills and are even a major source of marine pollution [34,35]. A majority of this non-food waste from restaurants can be recycled [36] but instead ends up in landfill. The only possible solution for this problem is to adopt the sustainable practice of procuring the raw materials. This depends on two factors: (a) availability and affordability, and (b) management’s procurement policy. Therefore, the next two variables of the construct were formed as “Procuring only recyclable/biodegradable cutlery, crockery, and other service equipment” and “Eco-friendly, recyclable/biodegradable cutlery, crockery, and other service equipment are economically

Figure 2. Tourism Service–Product Continuum (Author’s own illustration adopted from [15,16]).
cheap and easily available to buy.” Altogether, the service–setting sustainable supply chain management practices construct had five independent variables.

2.1.3. Service–Delivery Supply Chain Management Practices (SDSSCM)

The service delivery system [18] encompasses the operational process, human capital, intangible elements such as attitude, and the way in which food is served. It is not possible to implement sustainable supply chain management practices in service delivery without cooperation and coordination between all levels in an organization, irrespective of its size. This scale was developed with casual dining restaurants as the target population, in which the organization structure is simple with three levels of people—“The Owner/Management”, “Chefs”, and “Service Staff”. So, three variables, “The management is highly committed towards the implementation of SSCM practices”, “The food production employees (chefs/cooks) support and coordination in implementing SSCM practices”, and “Service staff support and coordination in implementing SSCM practices” were included in the construct. In recent years, especially since the COVID-19 pandemic and the invention of food delivery intermediaries, food takeaway and home delivery has grown sharply [37]. Two major factors related to service–delivery supply chain management emerge from the aforementioned trend: (a) eco-friendly food packaging, and (b) delivery [38]. Hence, “Procuring/designing eco-friendly take-away food packaging” was included to address the first factor. Regarding delivery, there are two strategies adopted in practice. Having their own vehicle for bulk purchase and handling special/bulk orders and selling through third-party food delivery service providers. Therefore, two variables included in the construct were “We have our own food delivery vehicles and can deliver food orders received by phone. The delivery vehicle is maintained in a sustainable manner” and “We depend on third-party food delivery service providers and are in frequent contact with them for the smooth flow of food, information, and financial transactions.” Altogether, the service–delivery sustainable supply chain management practices construct had six independent variables.

2.2. Sustainable Firm Performance (SFP)

The sustainable firm performance of the restaurant sector can be assessed through economic, operational, environmental, and socio-cultural dimensions [39–41]. The rationale for having separate constructs for economic and operational performance is to assess both financial and non-financial performance. The variables of the constructs are provided below.

2.2.1. Economic Performance (ECP)

The economic performance of restaurants can be analyzed based on the ‘input–output’ approach. Such input–output approaches are based on classic yield management theories. Hence, the variables used to assess the economic performance of restaurants are improvements in “average customer spent per visit/order”, “rate of return on investment”, “productivity”, “resource utilization”, “capacity utilization”, and a decrease in “total service delivery cost”, “total cash flow time” and “economies of transport” [4,42–45]. Thus, eight variables were selected for the construct of economic performance.

2.2.2. Operational Performance (OPP)

There are several studies that assess the operational performance of restaurants purely based on financial performance. However, this research classified economic performance as a separate construct. It therefore adopts the outcomes based on marketing and service quality theories to measure the operational performance which can be attained through improvements in “service delivery”, “customer satisfaction”, “customer retention/loyalty”, “customer relationships”, “operating ratio of actual to planned working hours (productivity standard—performance standard)” and a reduction in “service order lead-time” and “delivery lead-time” [20]. Thus, seven variables were selected for the construct of operational performance.
2.2.3. Environmental Performance (ENP)

Adopting sustainable supply chain management practices may influence the environmental performance of restaurants. There are several variables proposed for assessing the environmental performance of SMEs. However, the performance metrics of restaurants in terms of environment can be reflected through reduction in “overall energy consumption (both fuel and electricity)”, “waste discharge”, and “frequency of kitchen and service accidents” [46–50]. In addition, marine and coastal biodiversity have been reduced [51] and sustainability practices can increase the environmental performance of entities through “biodiversity protection in surrounding areas” [52]. Therefore, the construct for environmental performance was developed based on four variables.

2.2.4. Socio-Cultural Performance (SCP)

Recent studies in restaurant business performance has opened up the broader view of socio-cultural aspects which focuses on employee wellbeing, morale, restaurant image, and opportunities for society [53]. Such socio-cultural performances can be classified into two parts: internal-work-environment-related and external-market/society-related. Clear management policies and practices can lead to the sustainable internal socio-cultural performance of restaurants such as a boost in employee morale and a friendlier work environment [54]. Tourism and surrounding sectors such as the restaurant industry are closely related to the experience economy theory [55] and their brands are built around emotional design theory [56]. So, the brand image of restaurants with local cuisine highlighting locally grown vegetables are considered as promoting local culture and improving opportunities for the local community [57–59]. Therefore, four variables of improvements in “organizational work environment”, “morale of employees”, “restaurant brand image” and “opportunities for surrounding communities” were adopted to assess the socio-cultural performance of restaurants.

2.3. Innovation Adoption (INNO)

Irrespective of the organization size, innovation is an inevitable part of modern business operations, and is necessary to obtain a competitive advantage in markets with strong competition. Such innovation in the restaurant sector can be adopted through the products (food menus), operational processes (food preparation), marketing, technology and organizational processes [60–64]. Therefore, this research conceptualizes innovation adoption into four constructs; namely, product- and process-based innovation, marketing-based innovation, technology-based innovation and organizational innovation. The variables selected for each construct is explained in this section.

2.3.1. Product- and Process-Based Innovation (PPBI)

Product-based innovation in the restaurant sector is perceived as the introduction of new, healthy menu items, and minor changes in the kitchen amenities [63,65,66]. Therefore “Menu item innovations”, “Innovation through a healthy menu” and “Innovations through changes in the kitchen amenities” were adopted as three variables for the construct of product-based innovation. Further, innovations in process can positively influence sustainable firm performance. Such process-based innovation can be achieved through reducing cooking times and introducing new energy efficient cooking styles [6]. Additionally, innovation adoption is possible through service innovations. Thus, three variables, “The reduction of cooking time”, “Energy-efficient cooking”, and “Service innovation” were included to assess process-based innovation. Together, the product- and process-based innovation construct had six variables.

2.3.2. Marketing-Based Innovation (MRBI)

The adoption of the right tools, techniques, and channels for marketing is one of the most critical innovation-related activities for restaurants [67]. The most popular marketing-based innovation adoption of restaurants in recent years is the adoption of social media
marketing [7]. Another evolving trend, especially since the spread of the COVID-19 pandemic, is channel marketing through digital intermediaries [68]. Beyond these two emerging trends, two classic approaches for innovation in marketing can be through customer feedback and the imitation of leaders or competitors in the market [8,30,66]. Therefore, five variables, namely “Imitating the competitors”, “Adoption of social media marketing”, “Customer feedback”, “Marketing and selling through third-party service providers (smartphone applications such as Grab Food, Food Panda, etc.)” and “Competitor pressure” were used for the construct of marketing-based innovation adoption.

2.3.3. Technology-Based Innovation (TLBI)

Technology-based innovations are disrupting traditional service encounters and disrupting classic service quality theories [68]. Several new technologies have been introduced, such as augmented reality [69] and service robots [70]. However, the consumer safety perception has changed since the COVID-19 pandemic [71] and the focus of SMEs is more on the adoption of information technology. Hence, this research, due to the nature of its intended respondents (casual dining restaurants), limits the technology-based innovation adoption to accounting and information technology [7]. Thus, four variables “Adoption of a property management system (PMS)”, “Adoption of Point of Sales (POS)”, “Adoption of online reservation (restaurant website)” and “Adoption of smartphone reservation (own application in Android/IOS)” were included in the construct of technology-based innovation.

2.3.4. Organizational Innovation (ORBI)

The motivation for including a separate construct for organizational innovation is due to the emergence of COVID-19 pandemic and the pressure on organizations to adopt innovations to sustain in the market. Several studies have already tested organizational innovation as a separate construct in innovation adoption. The literature states that the organizational innovation of restaurants can be based on management practices, introducing new service options, training employees and enhancing their skills, and ‘change management’ through managing employee attitude. Thus, four variables “Service innovations”, “Management innovation”, “Employee attitude towards change” and “Employee training and skill enhancement” were chosen based on earlier studies [6,30,63] to assess organizational innovation adoption.

3. Hypothesis Development

3.1. SSCM and Sustainable Firm Performance

The impact of sustainable supply chain management practices on firm performance is widely studied in both the manufacturing and service sectors [72,73]. However, supply chain management research in tourism sectors are distinctive due to the service–product continuum of several sectors. Within the tourism supply chain, restaurant supply chain management practices are the invisible vital strengths of any destination. Hence, developing a scale for assessing the supply chain management practices of restaurants using Bruce Laval’s “Guestology” aspects of service–product, service–setting, and service–delivery system (3S) and assessing the impact on sustainable firm performance through economic, operational, environmental, and socio-cultural dimensions is vital but understudied. Therefore, the first hypothesis (Figure 3) of this research is framed as;

![Figure 3. Direct Relationship between SSCM and SFP (Conceptual Diagram 1).](image)

**Hypothesis 1 (H1).** Sustainable supply chain management practices have a positive impact on firm performance.
3.2. Mediating Effect of Innovation Adoption

Adopting innovative ways of doing business to obtain a competitive advantage in markets is as old as the first industrial revolution. However, studies on the influence of sustainable supply chain management practices on innovation adoption and its mediating effects on sustainable firm performance is relatively new and only limited studies tested the mediating effects of innovation adoption in sustainable restaurant firm performance. Chou et al. [74] studied the mediating role of innovation between the market orientation of restaurants and their performance, and found positive mediating effects. However, innovation adoption has become a key for firm performance ever since the immense changes of the COVID-19 pandemic in restaurant business operations. To the best of the authors’ knowledge, the mediating effects of innovation adoption between the sustainable supply chain management practices and the firm performance of the restaurant sector in Thailand was never studied. The following hypotheses were formed to fill the literature gap and to find the role of innovation adoption in the sustainable performance of restaurants in Thailand (Figure 4).

![Figure 4. Mediated Relationship between SSCM and SFP (Conceptual Diagram 2).](image)

Hypothesis 2 (H2). Sustainable supply chain management practices have a positive impact on innovation adoption.

Hypothesis 3 (H3). Innovation adoption positively affects firm performance.

Hypothesis 4 (H4). Innovation adoption mediates the relationship between sustainable supply chain practices and firm performance.

3.3. Moderated Mediation Effects of Socio-Demographic Factors

The moderating effects of socio-demographic factors such as age, gender, experience and education can bring more insight into the impact variations when a new variable is introduced [75,76]. The same has been tested in highly competitive and uncertain industries such as tourism [77–82]; this is because decision-making in such dynamic industries involves risks and the socio-demographic factors may moderate the relationship. However, a majority of that research focuses on understanding the customer/consumer markets. To the best of the authors’ knowledge, the moderation effects of social factors such as age, gender, experience, and education in the mediation effects of innovation between SSCM and SFP have not been tested. Therefore the following hypotheses (Figures 5–8) were formed.
Figure 5. Moderated Mediation of Age in the relationship between SSCM and SFP through Innovation Adoption (Conceptual Diagram 3). (a1, a2, a3, b1, b2, b3, and c: coefficient estimates).

Figure 6. Moderated Mediation of Gender in the relationship between SSCM and SFP through Innovation Adoption (Conceptual Diagram 4). (a1, a2, a3, b1, b2, b3, and c: coefficient estimates).

Figure 7. Moderated Mediation of Education in the relationship between SSCM and SFP through Innovation Adoption (Conceptual Diagram 5). (a1, a2, a3, b1, b2, b3, and c: coefficient estimates).
The experience of the respondents moderates the indirect path between sustainable supply chain management practices and sustainable firm performance through innovation adoption.  

Hypothesis 5d (H5d). The experience of the respondents moderates the indirect path between sustainable supply chain management practices and sustainable firm performance through innovation adoption.

4. Research Methodology
4.1. Population and Participants

Restaurateurs and the employees of seafood restaurants in coastal destinations were the target population of this study, because coastal tourism and seafood restaurants are the most popular themes in Thailand [83]. It is therefore appropriate to test a new model using the most popular theme due to its well-developed supply chain structure and practices. Another reason for choosing this theme is that it is comparatively less-explored than other themes [1]. The Prachuap Khiri Khan province was selected as the geographical area of study. This was due to the uniqueness of this province as a beach destination with only two primary attractions, its beaches and cuisine. The Huahin, Sam Roi Yot and Pranburi districts which have a high concentration of seafood restaurants were selected as the study area.

4.2. The Scale and Measures

The theoretical construct was first formed in the English language through a literature review as mentioned in Section 3 consisting of twenty three questions for SSCM (SPSSCM—12, SSSSCM—5, SDSSCM—6), twenty three questions for SFP (ECP—8, OPP—7, ENP—4, SCP—4), and nineteen questions for innovation adoption (PPBI—6, MRBI—5, TLBI—4 and ORBI 4). Thus, the theoretical construct consisted of sixty-five questions. The questionnaire was translated from English to the Thai language by native Thai speakers and the final theoretical construct was made available in bilingual format through both online and offline modes using Microsoft Forms and paper-pen printouts.
4.3. Pilot Survey, Content Validity and Face Validity

The theoretical relevance and practical appropriateness, content validity, face validity and language clarity was tested in two steps. The initial construct after the ethical committee approval was submitted to three academic experts in the field and the construct scale was reduced from sixty-five to sixty-one based on recommendations. Further, a randomized pilot study with 30 respondents was conducted after ethical committee approval. Based on the results of pilot study, the first three questions of the SPSSCM construct were combined into one single question as “Establishing close business relationships with perishable/non-perishable raw material suppliers for the smooth flow of raw materials, information, and financial transactions.” The separate questions related to primary and secondary packaging were combined into one single question reflecting both primary and secondary packaging. Two questions related to technology-based innovation (restaurant website and mobile applications) and one question related to marketing-based innovation (competitor pressure) were removed due to their inappropriateness for the scenario. The economic performance construct was simplified from eight variables to four variables. The socio-cultural construct was reduced from four variables into three by converging “Improvement of organizational work environment” and “Improvement in morale of employees” into “Improvements in morale of employees and organizational work environment.” Further, minor changes were made in both the English and Thai versions to reduce the wordiness and reduce the obscurity of the questions. The final construct after the pilot survey, content validity, and face validity consisted of fifty questions.

5. Data Analysis and Interpretation

5.1. Demographic Profile

Both offline and online modes were planned to collect data from the restaurants in Prachuap Khiri Khan province. However, the response rate for the online survey method was too low. Hence, the classic direct walk-in approach with printed questionnaires was adopted. A total of 226 restaurants were contacted and 178 valid responses were received during the period of August 2021–October 2021. The demographic profile of the respondents is provided in Table 1. The 33.14% majority of the respondents were in the age group of 26–33 followed by 30.33% in the age group of 34–41 and 20.22% in the age group of 42–49. The remaining 10.11% and 6.18% of the respondents were in the age group of 18–25 and above 50, respectively. A total of 37.64% of the respondents were male and the remaining 62.36% were female respondents. One question to uncover the education level of the respondents was included in the study. The results revealed that 58.99% of the respondents have a completed bachelor degree followed by 17.97% of the respondents with other qualifications such as technical education or certificate courses and the same percentage of the respondents reported having completed high school. Only 5.06% of the respondents completed a masters level of education. The target population aimed for this study was restaurateurs and staff with responsibilities. So, a separate question for seeking the profession of the respondents was included in the questionnaire. The results revealed that 55.06% of the respondents were Entrepreneur (Owner of the Hotel/Restaurant), followed by 10.67% Managers, 25.28% F&B Service Staff/Supervisor, 5.06% Others, 3.37% Chef, and 0.56% Store Manager/In-charge. Among the respondents, 51.68% reported they had more than 10 years of experience followed by 17.97% who reported 5–10 years and 3–5 years of experience each. Only 12.36% reported they had less than 3 years of experience. In terms of cuisine, the vast majority (80.33%) of the restaurants covered in this study were serving Thai cuisine, followed by 6.18% offering Western cuisine and 5.06% offering Multi-cuisine, and 1.12% Japanese cuisine. The Chinese, Indian, and Korean cuisine restaurants represented in this study were 0.56% each.
Table 1. Demographic Profile (n = 178).

| Age        | Frequency | Percent | Cumulative |
|------------|-----------|---------|------------|
| 18–25      | 18        | 10.112  | 10.112     |
| 26–33      | 59        | 33.146  | 43.258     |
| 34–41      | 54        | 30.337  | 73.596     |
| 42–49      | 36        | 20.225  | 93.82      |
| 50 above   | 11        | 6.18    | 100        |

| Gender     | Frequency | Percent | Cumulative |
|------------|-----------|---------|------------|
| Male       | 67        | 37.64   | 37.64      |
| Female     | 111       | 62.36   | 100        |

| Education  | Frequency | Percent | Cumulative |
|------------|-----------|---------|------------|
| High School| 32        | 17.978  | 17.978     |
| Bachelor   | 105       | 58.989  | 76.966     |
| Master     | 9         | 5.056   | 82.022     |
| Others     | 32        | 17.978  | 100        |

| Profession | Frequency | Percent | Cumulative |
|------------|-----------|---------|------------|
| Entrepreneur (Owner of the Hotel/Restaurant) | 98 | 55.056 | 55.056 |
| Manager    | 19        | 10.674  | 65.73      |
| F&B Service| 45        | 25.281  | 91.011     |
| Staff/Supervisor | 9 | 5.056 | 96.067 |
| Chef       | 6         | 3.371   | 99.438     |

| Store Manager/In-charge | Frequency | Percent | Cumulative |
|-------------------------|-----------|---------|------------|
| 1                       | 0.562     | 100     |

| Total_Experience | Frequency | Percent | Cumulative |
|-----------------|-----------|---------|------------|
| Less than 3 years | 22        | 12.36   | 12.36      |
| 3–5 Years       | 32        | 17.978  | 30.337     |
| 5–10 Years      | 32        | 17.978  | 48.315     |
| More than 10 Years | 92      | 51.685  | 100        |

| Cuisine        | Frequency | Percent | Cumulative |
|----------------|-----------|---------|------------|
| Thai           | 143       | 80.337  | 80.337     |
| Korean         | 1         | 0.562   | 80.899     |
| Japanese       | 2         | 1.124   | 82.022     |
| Chinese        | 1         | 0.562   | 82.584     |
| Indian         | 1         | 0.562   | 83.146     |
| Western        | 11        | 6.18    | 89.326     |
| Multi-cuisine  | 9         | 5.056   | 94.382     |
| Others         | 10        | 5.618   | 100        |

5.2. Exploratory Factor Analysis

5.2.1. Reliability

The unidimensional reliability of the constructs was tested by computing the Cronbach’s alpha and Mcdonald’s omega with 95% confidence interval and bootstrap interval with 1000 non-parametric bootstrapped samples. The threshold value for Cronbach’s alpha [84] and Mcdonald’s omega [85] is 0.70 to 0.95. The results from Table 2 infer that all items were reliable. Further exploratory factor analysis was conducted to test the theoretical dimensions and identify the number of factors loading. The same is presented in the next section.

5.2.2. Exploratory Factor Analysis

Exploratory factor analysis with promax rotation resulted in reducing five cross-loading variables from the model (Table 3). Hence, the final construct used for confirmatory factor analysis consisted of 45 items (SPSSCM—9, SSSSCM—3, SDSSCM—5, PPBI—5, ORBI—3, MRBI—4, TLBI—2, OPP—4, ECP—4, ENP—3, and SCP—3). Further, the sample data’s adequacy was tested using the assumption checks of the Kaiser–Meyer–Olkin test. The overall MSA results for SSCM, innovation and SFP were 0.895, 0.843, and 0.906, respectively.
Table 2. Frequentist Individual Item Reliability Statistics.

| Item   | ω    | α    | Item   | ω    | α    | Item   | ω    | α    |
|--------|------|------|--------|------|------|--------|------|------|
| SPSSCM3 | 0.909 | 0.933 | PDBI2  | 0.873 | 0.891 | ECP3   | 0.942 | 0.944 |
| SPSSCM4 | 0.9   | 0.929 | PDBI3  | 0.875 | 0.889 | ECP4   | 0.944 | 0.946 |
| SPSSCM5 | 0.903 | 0.932 | PRBI1  | 0.837 | 0.887 | ECP6   | 0.942 | 0.943 |
| SPSSCM7 | 0.898 | 0.928 | PRBI2  | 0.837 | 0.888 | ECP8   | 0.943 | 0.944 |
| SPSSCM8 | 0.897 | 0.928 | PRBI3  | 0.833 | 0.886 | OPP3   | 0.938 | 0.94 |
| SPSSCM9 | 0.902 | 0.93  | MRBI1  | 0.828 | 0.885 | OPP4   | 0.939 | 0.941 |
| SPSSCM10| 0.899 | 0.929 | MRBI2  | 0.865 | 0.887 | OPP5   | 0.939 | 0.94 |
| SPSSCM11| 0.897 | 0.928 | MRBI3  | 0.857 | 0.885 | OPP6   | 0.94  | 0.941 |
| SPSSCM12| 0.9   | 0.93  | MRBI4  | 0.886 | 0.898 | OPP7   | 0.938 | 0.941 |
| SSSSCM1 | 0.896 | 0.929 | TLBI1  | 0.866 | 0.888 | ENP1   | 0.94  | 0.942 |
| SSSSCM2 | 0.903 | 0.932 | TLBI2  | 0.866 | 0.888 | ENP2   | 0.938 | 0.941 |
| SSSSCM3 | 0.9   | 0.931 | ORBI1  | 0.872 | 0.891 | ENP3   | 0.938 | 0.941 |
| SSSSCM4 | 0.892 | 0.928 | ORBI2  | 0.869 | 0.889 | ENP4   | 0.937 | 0.94 |
| SSSSCM5 | 0.894 | 0.929 | ORBI3  | 0.869 | 0.889 | SCP1   | 0.939 | 0.942 |
| SDSSCM1 | 0.894 | 0.929 |        |       |      | SCP3   | 0.94  | 0.943 |
| SDSSCM2 | 0.924 | 0.928 |        |       |      | SCP4   | 0.94  | 0.942 |
| SDSSCM3 | 0.923 | 0.927 |        |       |      |        |       |      |
| SDSSCM4 | 0.924 | 0.928 |        |       |      |        |       |      |
| SDSSCM5 | 0.923 | 0.932 |        |       |      |        |       |      |
| SDSSCM6 | 0.923 | 0.929 |        |       |      |        |       |      |

Table 3. Results of Exploratory Factor Analysis.

| Factor Loadings for SSCM | Factor Loadings for Innovation | Factor Loadings SFP |
|-------------------------|-------------------------------|---------------------|
| Factor Loadings        | F1    | F2    | F3    | F1    | F2    | F3    | F4    | F1    | F2    | F3    | F4    |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| SPSSCM10               | 0.866 | PRBI2 | 0.918 |       | OPP5  | 0.977 |
| SPSSCM7                | 0.839 | PRBI1 | 0.905 |       | OPP4  | 0.969 |
| SPSSCM8                | 0.789 | PRBI3 | 0.743 |       | OPP6  | 0.841 |
| SPSSCM12               | 0.769 | PDBI3 | 0.708 |       | OPP3  | 0.576 |
| SPSSCM4                | 0.768 | PDBI2 | 0.502 |       | ECP6  | 0.946 |
| SPSSCM11               | 0.739 | ORBI3 | 0.946 |       | ECP8  | 0.817 |
| SPSSCM5                | 0.714 | ORBI2 | 0.886 |       | ECP4  | 0.675 |
| SPSSCM3                | 0.516 | ORBI1 | 0.833 |       | ECP3  | 0.632 |
| SPSSCM9                | 0.41  | MRBI3 | 0.833 |       | ENP3  | 0.967 |
| SDSSCM4                | 1.034 | MRBI2 | 0.752 |       | ENP4  | 0.658 |
| SDSSCM5                | 1.014 | MRBI1 | 0.606 |       | ENP1  | 0.645 |
| SDSSCM2                | 1.007 | MRBI4 | 0.507 |       | SCP3  | 0.77  |
| SDSSCM6                | 0.645 | TLBI1 | 0.88  |       | SCP4  | 0.708 |
| SDSSCM5                | 0.561 | TLBI2 | 0.806 |       | SCP2  | 0.521 |
| SDSSCM1                | 0.432 |       |       |       |       |       |       |
| SSSSCM2                | 0.998 |       |       |       |       |       |       |
| SSSSCM3                | 0.874 |       |       |       |       |       |       |
| SSSSCM4                | 0.454 |       |       |       |       |       |       |

Note. Applied rotation method is promax.

5.3. Confirmatory Factor Analysis
5.3.1. Model Suitability

We adopted the model suitability testing approach [86,87] by developing three different models namely, the “3 factor model”, “bifactor model” and “hierarchical model” for each construct. The three models were tested to identify the most suitable model fit and to identify the best suitable model applicable with the data. The second order model, also known as the hierarchical model, was found to be most suitable for all three constructs, hence adopted in this study.
5.3.2. Unidimensionality

This study uses three different higher-order scales to measure the SSCM, SFP and innovation adoption separately. In such cases, testing the unidimensionality [88] of each scale is highly recommended [89]. Hence, the unidimensionality of the three higher order models were tested and presented in Table 4 and Figures 9–11. In confirmatory factor analysis, Threshold levels of Chi-Square ($\chi^2$) $p > 0.05$ [90]; absolute fit indices of CMIN/DF < 3 [91], Root Mean square Residual (RMR) < 0.09, Standardized Root Mean Square Residual (SRMR) < 0.1 [91,92]; and Incremental Fit Indices threshold levels of Comparative Fit Index (CFI) 0.90 [93,94], Tucker–Lewis Index (TLI)/Bentler–Bonett Non-Normed Fit Index (NNFI) > 0.90 [95], Bentler–Bonett Normed Fit Index (NFI) > 0.90 [90], Bollen’s Incremental Fit Index (IFI) > 0.90, Relative Noncentrality Index (RNI) close to 0.95 and Bollen’s Relative Fit Index (RFI) values close to 1 are the indices and their threshold levels to declare a model to be “good fit”. The fit indices of each model and the validity and reliability of both first order and second order factors are presented in the next section.

Table 4. Model fit Indices.

|          | SSCM   | INNO   | SFP    |
|----------|--------|--------|--------|
| chisq    | 281.278| 203.172| 167.475|
| df       | 116    | 73     | 73     |
| $\chi^2$/df | 2.42  | 2.78   | 2.29   |
| p value  | 0      | 0      | 0      |
| srmr     | 0.095  | 0.098  | 0.059  |
| cfi      | 0.926  | 0.923  | 0.949  |
| tli      | 0.914  | 0.904  | 0.937  |
| nnfi     | 0.914  | 0.904  | 0.937  |
| nfi      | 0.881  | 0.886  | 0.915  |
| ifi      | 0.927  | 0.923  | 0.950  |
| rfi      | 0.861  | 0.858  | 0.894  |
| rni      | 0.926  | 0.923  | 0.949  |

Figure 9. Higher-order Model of SSCM.
5.3.3. Sustainable Supply Chain Management Practices

The convergent validity, discriminant validity and reliability of the construct for SSCM was tested using the semtools package [96] in R programming language [97]. With avevar (AVE Threshold > 0.5) values of 0.5045223, 0.7124355, 0.6849700, CR (omega Threshold > 0.7) values of 0.9005764, 0.8764009, 0.9138426, and alpha (Cronbach’s alpha Threshold > 0.7) values of 0.8982487, 0.8583929, 0.9324432, the model was reliable and valid. The second order reliability of the SSCM model was tested [96] and the reliability values of the second order factor SSCM at level 1 (0.8315142) and level 2 (0.8927784) and the value of partial reliability (0.9499270) after partialling first order factors was 0.8548071, 0.9299934, 0.8722826, 0.8553093, for ECP, OPP, ENP and SCP, the model was reliable and valid. Further, the model fit indices values of chisq = 281.278, df = 116, Chiqsq/df = 2.42, p value = 0, srmr = 0.095, cfi = 0.926, tli = 0.914, nfi = 0.914, rfi = 0.881, ifi = 0.927, rfi = 0.861 and rni = 0.926 indicates that the model is fit and acceptable. The second order reliability of the SSCM model was tested [96] and the reliability values of the second order factor INNO at level 1 (0.7407799) and level 2 (0.8927784) and the value of partial reliability (0.9499270) after partialling first order factors was 0.8583929, 0.9324432, 0.8758890, 0.8551607, and alpha (Cronbach’s alpha Threshold > 0.7) values for PPBI, MRBI, TLBI, ORBI were 0.5865631, 0.4424114, 0.6849700, 0.556 and the Beta estimate of 0.402 infers that there is a positive effect between SSCM and SFP. The same is presented in Figure 12, 13.

Figure 10. Higher-order Model of SFP.

Figure 11. Higher-order model of Innovation Adoption.
second-order factor SSCM at level 1 (0.6505278) and level 2 (0.6806209) and the value of partial reliability (0.9177313) after partialling first-order factor uniqueness prove that the higher-order model is acceptably reliable.

5.3.4. Sustainable Firm Performance

The similar approach from the previous step was repeated to test the convergent validity, discriminant validity and reliability of the SFP construct. With avevar (AVE Threshold > 0.5) values of 0.6045850, 0.7757035, 0.7029516, 0.6634199, CR (omega Threshold > 0.7) values of 0.8583929, 0.9324432, 0.8758890, 0.8551607, and alpha (Cronbach’s alpha Threshold > 0.7) values of 0.8548071, 0.9299934, 0.8722826, 0.8553093, for ECP, OPP, ENP and SCP, the model was reliable and valid. Further, the model fit indices values of chisq = 167.475, df = 73, Chiqsq/df = 2.29, p value = 0, srmr = 0.059, cfi = 0.949, tli = 0.937, nffi = 0.937, nfi = 0.915, ifi = 0.950, rfi = 0.894 and rmi = 0.949 indicates that the model is fit and acceptable. The second order reliability of the SFP model was tested [96] and the reliability values of the second-order factor SFP at level 1 (0.8315142) and level 2 (0.8927784) and the value of partial reliability (0.9499270) after partialling first-order factor uniqueness prove that the higher-order model is reliable.

5.3.5. Innovation Adoption

The avevar for PPBI, MRBI, TLBI, ORBI for the model was 0.5865631, 0.4424114, 0.8587051, 0.8372528. The lower avevar for the marketing-based innovation adoption was due to the variable “Marketing and selling through third-party service providers (Grab Food, Food Panda, etc.)”. The response level for this variable was below average of the other variables. Because most of the restaurateurs preferred receiving guests in their restaurant and letting them experience the hospitality rather than selling for takeaways. Further, the composite reliability was tested and the values for PPBI, MRBI, TLBI, ORBI were found as 0.8735975, 0.7596277, 0.9238909, and 0.9390420, respectively. This is above the threshold level of > 0.7. Carefully considering the changing market trend and the importance of the variable, the MRBI4 was retained in the study. Additionally, Cronbach's alpha (Threshold > 0.7) value for PPBI, MRBI, TLBI, ORBI was 0.8674303, 0.7614521, 0.9226919 and 0.9380157. Hence, the model was reliable and valid. The model fit indices values of chisq = 167.475, df = 73, Chiqsq/df = 2.28, p value = 0, srmr = 0.098, cfi = 0.904, nffi = 0.904, nfi = 0.886, ifi = 0.923, rfi = 0.858 and rmi = 0.923 indicates that the model is fit and acceptable. The second order reliability of the INNO model was tested [96] and the reliability values of the second-order factor INNO at level 1 (0.7407799) and level 2 (0.7204946) and the value of partial reliability (0.9192507) after partialling first-order factor uniqueness prove that the higher-order model is reliable.

5.4. Direct, Mediation and Moderated Mediation Effects

The factor score of the higher-order latent variables from the CFA models was computed and used for testing the hypothesis of direct, moderation and moderated mediation effects using processR package [98] in R.

5.4.1. Direct Effect between SSCM and SFP

Several studies in the past have tested the direct effects of sustainable supply chain management practices on firm performance and found a positive impact. With 95% bootstrap confidence interval range of 0.263–0.556 and the Beta estimate of 0.402 infers that there is a positive effect between SSCM and SFP. The same is presented in Figure 12, Tables 5 and 6. This study also in line with previous findings [4,5,64,72,89] infer that adopting sustainable supply chain management practices will lead to sustainable firm performance, hence $H1$ is accepted.
5.4.2. Mediation Effects of Innovation Adoption

Innovation has been identified as a factor for sustainable firm performance. The mediating effects of innovation adoption between the sustainable supply chain management practices and firm performance in the restaurant sector has not been tested. Hence, mediation analysis was conducted to test the H2, H3, and H4. It is evident from the results that the direct effects of SSCM on SFP weakens and becomes statistically insignificant ($B = 0.017$, $p = 0.832$) upon introduction of Innovation Adoption. The indirect effects of innovation adoption (INNO) mediates the relationship between SSCM practices and sustainable firm performance (SFP) i.e., estimates of $(a)*(b)$ is 0.1207, with Confidence Interval CI = 0.0253 to 0.520, which indicates that the indirect effects are statistically significant. Hence, it can be concluded that there is evidence of complete mediation of INNO in the relationship between SSCM and SFP. Therefore, H2, H3, and H4 are are accepted. The same is presented in Figure 13, Tables 7 and 8.

![Figure 12. Direct Effect of SSCM on SFP.](image)

**Table 5.** Direct Effect Summary: SSCM—SFP.

| Effect | Equation | Estimate | $p$ | $\beta$ |
|--------|----------|----------|-----|--------|
| direct | $c$      | 0.402    | $<0.001$ | 0.356 |

![Figure 13. The Mediation Effect of Innovation Adoption between SSCM and SFP.](image)

**Table 6.** Model Estimates: SSCM—SFP.

| Variables | Predictors | Label | $B$  | $SE$  | $z$  | $p$      | $\beta$ |
|-----------|------------|-------|------|-------|------|----------|---------|
| SFP       | SSCM       | $c$   | 0.402| 0.074 | 5.436| $<0.001$ | 0.356   |

5.5.1. Moderated Mediation Effects of Age

Moderated mediation analysis was conducted to test the age moderation effects of innovation adoption between the sustainable supply chain management practices and sustainable firm performance. Therefore, H5a is rejected.

![Figure 14.](image)

**Table 7.** Mediation Summary: SSCM—INNO—SFP.

| Effect            | Equation      | Estimate | $95\%$ Bootstrap CI |
|-------------------|---------------|----------|---------------------|
| indirect          | $(a)*(b)$     | 0.386    | $(0.253$ to 0.520)  |
| direct            | $c$           | 0.017    | $(-0.130$ to 0.180) |
| total             | direct + indirect | 0.402   | $(0.265$ to 0.558)  |
| prop.mediated     | indirect/total| 0.959    | $(0.618$ to 1.448)  |
5.5. Moderated Mediation Effects of Socio-Cultural Factors

5.5.1. Moderated Mediation Effects of Age

To investigate the research hypothesis H5 (see Figure 3), the moderated mediation analysis was using the R packages of Lavaan [99] and ProcessR [98]. The variables SSCM, SFP was the predictor and outcome variables, while the variable INNO was the mediating variable. The conditional indirect effects of SSCM on SFP through INNO was investigated by using age as an moderator to analyze the moderated mediation. The ProcessR package in R programming language with lavaan syntax mimicking “PROCESS” macro model 58 [100] with bias-corrected 95% confidence intervals (n = 1000) was utilized to test the significant indirect effects when moderated by age. The significance of effects were identified by the confidence interval levels (i.e., different from 0).

The hypothesized moderated mediation model was tested using the R packages of Lavaan and ProcessR and mimicking the PROCESS macro model number 58, which tests a model whereby Age moderates the effect of path a and b (Figure 14). Age was found to not moderate the effect of SSCM -> INNO (B = 0.020, se = 0.079, Z = 0.254 and p = 0.800) and INNO -> SFP (B = 0.038, se = 0.051, Z = 0.744 and p = 0.457). The results (Figure 13, Tables 9 and 10) imply that irrespective of age, innovation adoption mediates the relationship between SSCM and SFP. In other terms there are no statistically significant moderation effects of age in the mediation effects of SSCM -> INNO -> SFP. Hence, H5a is rejected.

Figure 14. The Moderated Mediation Effect of Age in SSCM -> INNO -> SFP.

5.5.2. Moderated Mediation Effects of Gender

The same model, tools and test as mentioned in Section 5.5.1 with gender as the moderating variable was analyzed to test the hypothesis H5b.

The results of the moderated mediation analysis infer that gender differences do not moderate the mediated relationship between SSCM and SFP. Gender was found to not moderate the effect of SSCM -> INNO (B = 0.032, se = 0.164, Z = 0.194 and p = 0.846) and

Table 8. Model Estimates: SSCM—INNO—SFP.

| Variables | Predictors | Label | B    | SE  | z     | p     | β   |
|-----------|------------|-------|------|-----|-------|-------|-----|
| INNO      | SSCM       | a     | 0.565| 0.075| 7.509 | <0.001| 0.516|
| SFP       | SSCM       | c     | 0.017| 0.079| 0.212 | 0.832 | 0.015|
| SFP       | INNO       | b     | 0.682| 0.080| 8.519 | <0.001| 0.660|

Table 9. Moderated Mediation of Age Bootstrap Summary: SSCM—INNO—SFP.

| Effect Equation | Estimate | 95% Bootstrap CI | Boot.ci.type = perc |
|-----------------|----------|------------------|---------------------|
| indirect        | 0.382    | (0.250 to 0.516) |                     |
| direct          | 0.018    | (−0.123 to 0.180)|                     |
| total           | 0.400    | (0.248 to 0.554) |                     |
| prop.mediated   | 0.955    | (0.619 to 1.425) |                     |
| indirect.below  | 0.345    | (0.152 to 0.566) |                     |
| indirect.above  | 0.420    | (0.250 to 0.594) |                     |
| direct.below    | 0.018    | (−0.123 to 0.180)|                     |
| direct.above    | 0.018    | (−0.123 to 0.180)|                     |
| total.below     | 0.363    | (0.147 to 0.581) |                     |
| total.above     | 0.438    | (0.239 to 0.624) |                     |
| prop.mediated.below | 0.95   | (0.553 to 1.618)|                     |
| prop.mediated.above | 0.959  | (0.653 to 1.426)|                     |
INNO -> SFP (B = −0.185, se = 0.128, Z = −1.440 and p = 0.150). The results (Figure 15, Tables 11 and 12) imply that irrespective of gender, innovation adoption mediates the relationship between SSCM and SFP. In other terms there are no statistically significant moderation effects of gender in the mediation effects of SSCM -> INNO -> SFP. Hence H5b is rejected.

Table 9. Moderated Mediation of Age Bootstrap Summary: SSCM—INNO—SFP.

| Effect   | Equation                                                                 | Estimate | 95% Bootstrap CI Boot.CI.Type = Perc |
|----------|--------------------------------------------------------------------------|----------|--------------------------------------|
| indirect | (a1+a3*Age.mean)*(b1+b3*Age.mean)                                       | 0.382    | (0.250 to 0.516)                     |
| direct   | c                                                                        | 0.018    | (−0.123 to 0.180)                    |
| total    | direct+indirect                                                          | 0.400    | (0.248 to 0.554)                     |
| prop.mediated | indirect/total                           | 0.955    | (0.619 to 1.425)                     |
| indirect.below | (a1+a3*(Age.mean-sqrt(Age.var)))* (b1+b3*(Age.mean-sqrt(Age.var))) | 0.345    | (0.152 to 0.566)                     |
| indirect.above | (a1+a3*(Age.mean+sqrt(Age.var)))* (b1+b3*(Age.mean+sqrt(Age.var))) | 0.420    | (0.250 to 0.594)                     |
| direct.below | c                                                                        | 0.018    | (−0.123 to 0.180)                    |
| direct.above | c                                                                        | 0.018    | (−0.123 to 0.180)                    |
| total.below | direct.below+indirect.below                                              | 0.363    | (0.147 to 0.581)                     |
| total.above | direct.above+indirect.above                                              | 0.438    | (0.239 to 0.624)                     |
| prop.mediated.below | indirect.below/total.below                                              | 0.950    | (0.553 to 1.618)                     |
| prop.mediated.above | indirect.above/total.above                                              | 0.959    | (0.653 to 1.426)                     |

Table 10. Moderated Mediation of Age: Estimates.

| Variables | Predictors | Label | B     | SE    | z     | p     | β     |
|-----------|------------|-------|-------|-------|-------|-------|-------|
| INNO      | SSCM       | a1    | 0.500 | 0.257 | 1.948 | 0.051 | 0.459 |
| INNO      | Age        | a2    | −0.026| 0.025 | −1.018| 0.308 | −0.080|
| INNO      | SSCM:Age   | a3    | 0.020 | 0.079 | 0.254 | 0.800 | 0.056 |
| SFP       | SSCM       | c     | 0.018 | 0.080 | 0.228 | 0.820 | 0.017 |
| SFP       | INNO       | b1    | 0.580 | 0.184 | 3.157 | 0.002 | 0.584 |
| SFP       | Age        | b2    | 0.016 | 0.016 | 1.016 | 0.310 | 0.052 |
| SFP       | INNO:Age   | b3    | 0.038 | 0.051 | 0.744 | 0.457 | 1.120 |

Table 11. Moderated Mediation of Gender Bootstrap Summary: SSCM—INNO—SFP.

| Effect   | Equation                                                                 | Estimate | 95% Bootstrap CI Boot.CI.Type = Perc |
|----------|--------------------------------------------------------------------------|----------|--------------------------------------|
| indirect | (a1+a3*Gender.mean)*(b1+b3*Gender.mean)                                 | 0.398    | (0.260 to 0.538)                     |
| direct   | c                                                                        | −0.005   | (−0.154 to 0.162)                    |
| total    | direct+indirect                                                          | 0.393    | (0.231 to 0.556)                     |
| prop.mediated | indirect/total                           | 1.012    | (0.673 to 1.548)                     |
| indirect.below | (a1+a3*(Gender.mean-sqrt(Gender.var)))* (b1+b3*(Gender.mean-sqrt(Gender.var))) | 0.437    | (0.281 to 0.600)                     |
| indirect.above | (a1+a3*(Gender.mean+sqrt(Gender.var)))* (b1+b3*(Gender.mean+sqrt(Gender.var))) | 0.357    | (0.165 to 0.559)                     |
| direct.below | c                                                                        | −0.005   | (−0.154 to 0.162)                    |
| direct.above | c                                                                        | −0.005   | (−0.154 to 0.162)                    |
| total.below | direct.below+indirect.below                                              | 0.432    | (0.263 to 0.628)                     |
| total.above | direct.above+indirect.above                                              | 0.352    | (0.132 to 0.567)                     |
| prop.mediated.below | indirect.below/total.below                                              | 1.011    | (0.694 to 1.493)                     |
| prop.mediated.above | indirect.above/total.above                                              | 1.014    | (0.622 to 1.837)                     |
Table 12. Moderated Mediation of Gender Estimates.

| Variables | Predictors | Label   | B    | SE   | z     | p     | β     |
|-----------|------------|---------|------|------|-------|-------|-------|
| INNO      | SSCM       | a1      | 0.517| 0.235| 2.199 | 0.028 | 0.472 |
| INNO      | Gender     | a2      | −0.087| 0.049| −1.792| 0.073 | −0.123|
| INNO      | SSCM:Gender| a3      | 0.032| 0.164| 0.194 | 0.846 | 0.046 |
| SFP       | SSCM       | c       | −0.005| 0.002| −0.060| 0.952 | −0.004|
| SFP       | INNO       | b1      | 1.001| 0.213| 4.693 | <0.001| 0.816 |
| SFP       | Gender     | b2      | 0.074| 0.046| 1.628 | 0.104 | 0.085 |
| SFP       | INNO:Gender| b3      | −0.185| 0.128| −1.440| 0.150 | −0.252|

5.5.2. Moderated Mediation Effects of Gender

The same model, tools and test as mentioned in Section 5.1 with gender as the moderating variable was analyzed to test the hypothesis H5b. The results of the moderated mediation analysis infer that gender differences do not moderate the mediated relationship between SSCM and SFP. Gender was found to not moderate the effect of SSCM > INNO (B = 0.032, se = 0.164, Z= 0.194 and p = 0.846) and INNO > SFP (B = −0.185, se = 0.128, Z= −1.440 and p = 0.150). The results (Figure 15, Table 11) imply that irrespective of gender, innovation adoption mediates the relationship between SSCM and SFP. In other terms there are no statistically significant moderation effects of gender in the mediation effects of SSCM > INNO > SFP. Hence H5b is rejected.

Figure 15. The Moderated Mediation Effect of Gender in SSCM -> INNO -> SFP.

5.5.3. Moderated Mediation Effects of Education

Education has been the driver for innovation adoption. Several studies have proved that education is positively related to innovation adoption [101–106]. Hence, this study framed the hypothesis 5c to test the moderation effects of education level in the relationship between SSCM and SFP through INNO.

In contrast to earlier studies, the results in this case failed to prove any moderated mediation effects of Education. With B = −0.08, se = 0.093, Z = −0.084, and p = 0.933 (Figure 16, Tables 13 and 14) the moderating effects of Education in the relationship between SSCM and Innovation was not significant. Similarly, with B = 0.086, se = 0.073, Z = 1.170, and p = 0.242, the moderating effects of education in the relationship between INNO and SFP was also not significant. Hence, H5c is rejected.
prop.mediated.above indirect.above/total.above 1.014 (0.622 to 1.837)

Table 12. Moderated Mediation of Gender Estimates.

| Variables       | Predictors       | Label | B     | SE   | z       | p       | β      |
|-----------------|------------------|-------|-------|------|---------|---------|--------|
| INNO            | SSCM             | a1    | 0.517 | 0.235| 2.199   | 0.028   | 0.472  |
| INNO            | Gender           | a2    | -0.087| 0.049| -1.792  | 0.073   | -0.123 |
| INNO            | SSCM:Gender      | a3    | 0.032 | 0.164| 0.194   | 0.846   | 0.046  |
| SFP             | SSCM             | c     | -0.005| 0.0   | 0.02    | 0.952   | -0.004 |
| SFP             | INNO             | b1    | 1.001 | 0.213| 4.693   | <0.001  | 0.816  |
| SFP             | Education        | b2    | 0.074 | 0.046| 1.628   | 0.104   | 0.085  |
| SFP             | INNO:Education   | b3    | -0.185| 0.128| -1.440  | 0.150   | -0.252 |

5.3. Moderated Mediation Effects of Education

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In contrast to earlier studies, the results in this case failed to prove any moderated mediation effects of Education. With \( B = -0.08, \) \( SE = 0.093, \) \( Z = -1.792, \) and \( p = 0.073 \) (Figure 16, Table 3 and 14) the moderating effects of Education in the relationship between SSCM and Innovation was not significant. Similarly, with \( B = 0.086, \) \( SE = 0.073, \) \( Z = 1.628, \) and \( p = 0.104 \) the moderating effects of education in the relationship between INNO and SFP was also not significant. Hence, \( H5c \) is rejected.

Figure 16. The Moderated Mediation Effect of Education in SSCM -> INNO -> SFP.

Table 13. Moderated Mediation of Education Bootstrap Summary: SSCM—INNO—SFP.

| Effect       | Equation                                                                 | Estimate | 95% Bootstrap CI |
|--------------|---------------------------------------------------------------------------|----------|------------------|
| indirect     | \( (a1 + a3 \times \text{Education.mean}) \times (b1 + b3 \times \text{Education.mean}) \) | 0.390    | (0.266 to 0.531) |
| direct       | c                                                                         | 0.016    | (-0.141 to 0.174)|
| total        | direct+indirect                                                          | 0.406    | (0.269 to 0.577) |
| prop.mediated| indirect/total                                                            | 0.961    | (0.642 to 1.445) |
| indirect.below| \( (a1 + a3 \times (\text{Education.mean} - \sqrt{\text{Education.var}})) \times (b1 + b3 \times (\text{Education.mean} - \sqrt{\text{Education.var}})) \) | 0.354    | (0.200 to 0.547) |
| indirect.above| \( (a1 + a3 \times (\text{Education.mean} + \sqrt{\text{Education.var}})) \times (b1 + b3 \times (\text{Education.mean} + \sqrt{\text{Education.var}})) \) | 0.426    | (0.250 to 0.615) |
| direct.below  | c                                                                         | 0.016    | (-0.141 to 0.174)|
| direct.above  | c                                                                         | 0.016    | (-0.141 to 0.174)|
| total.below   | direct.below+indirect.below                                              | 0.369    | (0.192 to 0.577) |
| total.above   | direct.above+indirect.above                                              | 0.441    | (0.245 to 0.637) |
| prop.mediated.below| indirect.below/total.below                                               | 0.958    | (0.597 to 1.569) |
| prop.mediated.above| indirect.above/total.above                                               | 0.965    | (0.666 to 1.412) |

Table 14. Moderated Mediation of Education Estimates.

| Variables       | Predictors       | Label | B     | SE   | z       | p       | β      |
|-----------------|------------------|-------|-------|------|---------|---------|--------|
| INNO            | SSCM             | a1    | 0.583 | 0.234| 2.498   | 0.012   | 0.533  |
| INNO            | Education        | a2    | 0.010 | 0.027| 0.357   | 0.721   | 0.023  |
| INNO            | SSCM:Education   | a3    | -0.008| 0.093| -0.084  | 0.933   | -0.018 |
| SFP             | SSCM             | c     | 0.016 | 0.079| 0.199   | 0.843   | 0.015  |
| SFP             | INNO             | b1    | 0.477 | 0.182| 2.627   | 0.009   | 0.496  |
| SFP             | Education        | b2    | -0.017| 0.022| -0.780  | 0.435   | -0.043 |
| SFP             | INNO:Education   | b3    | 0.086 | 0.073| 1.170   | 0.242   | 0.227  |
5.5.4. Moderated Mediation Effects of Total Experience

The final hypothesis of moderated mediation effects of Experience in the relationship between SSCM and SFP through Innovation Adoption was tested. The motivation for adopting experience as a moderated mediation is from the available literature on the role of experience in adoption of new technology and innovations [107–109].

The results (Figure 17, Tables 15 and 16) of the indirect effects estimate (0.366) and bootstrap confidence interval of 0.247 to 0.505 prove that there is a significant influence of experience on Innovation (B = 0.081, SE = 0.020, Z = 4.076, p < 0.01) and SFP (B = 0.057, SE = 0.019, Z = 3.019, p < 0.003). Hence H5d is accepted. In other words, irrespective of age, gender and education, experience is the only variable that moderates the mediating relationship of innovation adoption between SSCM and SFP.

![Figure 17. The Moderated Mediation Effect of Experience in SSCM -> INNO -> SFP.](image)

| Effect                  | Equation                                                                 | Estimate | 95% Bootstrap CI                        |
|-------------------------|--------------------------------------------------------------------------|----------|-----------------------------------------|
| indirect                | (a1+a3*Exp.mean)*(b1+b3*Exp.mean)                                        | 0.366    | (0.247 to 0.505)                        |
| direct                  | c                                                                        | 0.070    | (−0.080 to 0.233)                       |
| total                   | direct+indirect                                                          | 0.436    | (0.302 to 0.592)                        |
| prop.mediated           | indirect/total                                                           | 0.840    | (0.551 to 1.241)                        |
| indirect.below          | (a1+a3*(Exp.mean-sqrt(Exp.var)))*(b1+b3*(Exp.mean-sqrt(Exp.var)))        | 0.486    | (0.284 to 0.689)                        |
| indirect.above          | (a1+a3*(Exp.mean+sqrt(Exp.var)))*(b1+b3*(Exp.mean+sqrt(Exp.var)))        | 0.262    | (0.145 to 0.415)                        |
| direct.below            | c                                                                        | 0.070    | (−0.080 to 0.233)                       |
| direct.above            | c                                                                        | 0.070    | (−0.080 to 0.233)                       |
| total.below             | direct.below+indirect.below                                              | 0.556    | (0.341 to 0.763)                        |
| total.above             | direct.above+indirect.above                                              | 0.332    | (0.177 to 0.504)                        |
| prop.mediated.below     | indirect.below/total.below                                               | 0.875    | (0.619 to 1.177)                        |
| prop.mediated.above     | indirect.above/total.above                                               | 0.790    | (0.435 to 1.339)                        |
Table 16. Moderated Mediation of Experience Estimates.

| Variables | Predictors | Label | B    | SE   | z     | p      | β    |
|-----------|------------|-------|------|------|-------|--------|------|
| INNO      | SSCM       | a1    | 0.913| 0.234| 3.905 | <0.001 | 0.822 |
| INNO      | Exp        | a2    | 0.081| 0.020| 4.076 | <0.001 | 0.251 |
| INNO      | SSCM:Exp   | a3    | -0.103| 0.067| -1.542| 0.123  | -0.305|
| SFP       | SSCM       | c     | 0.070| 0.080| 0.875 | 0.382  | 0.055 |
| SFP       | INNO       | b1    | 0.821| 0.197| 4.175 | <0.001 | 0.715 |
| SFP       | Exp        | b2    | 0.057| 0.019| 3.019 | 0.003  | 0.154 |
| SFP       | INNO:Exp   | b3    | -0.067| 0.053| -1.256| 0.209  | -0.183|

6. Findings and Discussion

SSCM, SFP and Innovation adoption has been three different topics of studies carried out either in combination or separately in the past few decades. This study highlights the service–product continuum of tourism industry, especially the food and beverage service sector and address the following issues:

(a) The need for a scale for assessing SSCM practices of tier one tourism supply chain with (input—process—output) internal and external consumers, and tier two service/product providers in the tourism industry.

(b) The service–product continuum of the tourism industry, thus a three construct higher-order scale (SPSSCM, SSSSCM, and SDSSCM) for assessing the SSCM practices.

(c) Three separate higher-order scales for assessing SSCM, SFP and INNO in the food and beverage service sector.

(d) The direct effects of SSCM on SFP.

(e) The mediating (indirect) effects of Innovation adoption in the relationship between SSCM and SFP.

(f) The moderated mediation effects of socio-demographic factors in the mediated relationship between SSCM and SFP through INNO.

The present study through intensive literature review developed three higher-order constructs for assessing SSCM, SFP and INNO in the food and beverage service sector. The initial theoretical scale consisted of 65 items. The scale’s face validity, content validity and scenario suitability was tested during pilot study and the scale was reduced to 50 items. The questionnaire was used to collect data from 226 respondents (Restaurateurs/F&B professionals) in Parchup Kiri khan Province, Thailand. A total of 178 valid responses were used in this study of which 55.05% responses were from entrepreneurs, 10.67% responses were from managers, 3.37% were Chef, 0.562% were store manager/incharge and 5.05% others. Further, EFA was conducted to test the consistency of the scale through reliability and validity. Five items with cross-loadings were deleted and the remaining forty five items were used to test the CFA and causal relationships. The CFA of models inferred that the model fit indices were good. Further, the direct, indirect, and conditional effects of SSCM and SFP through INNO and socio-demographic factors were tested using the ProcessR and Lavaan package in R. The results disseminated the direct effects of SSCM on SFP were positive. However, upon introduction of the Innovation adoption variable, the effects of SSCM on SFP became insignificant and were completely mediated through Innovation adoption. This finding is important in the field of tourism supply chain related studies, because the role of innovation adoption in the tourism sector especially the MSMEs is understudied. This study also conducted moderated mediation analysis to identify any indirect effects of socio-demographic factors in the mediation effects of INNO and failed to find any significant effects of socio-demographic variables of age, gender, and education. Only experience was found to be significant. In other words, one unit of standard deviation in experience of the restaurateur can influence one unit of their level of innovation adoption and further lead to firm performance.
7. Implications

7.1. Theoretical Implications

Various studies have explored the concept of SSCM practices for both the production and service sector. Still, the phenomenon for the tourism sector is not clear due to the heterogeneity and service–product continuum of the industry. Therefore, this study integrated service–product, service–setting and service–delivery to develop a scale for assessing the SSCM of the tourism sector. However, focused only on testing only with the midrange casual dining restaurants. From a theoretical angle, this scale has immense opportunity to be adopted and tested in other tourism sectors such as hotels, fine-dining restaurants and so on. The findings broaden the work of several studies that have tested the effects of SSCM on SFP [4,60,72,89] by including the mediation effects of innovation adoption in between the SSCM and SFP. This is vital because the food and beverage service sector is under immense pressure for innovation adoption since the COVID 19 pandemic [9,68]. Irrespective of age, gender, education level, and experience, the adoption of innovation level completely mediates the relationship between SSCM and SFP in the food and beverage industry. Thus, this paper serves as a systematically developed theoretical foundation for assessing SSCM practices and SFP through INNO in the tourism sectors.

7.2. Entrepreneurial and Managerial Implications

This scale was developed with restauranters, managers and supervisors of small and medium sized casual dining restaurants in mind. The scale was already tested for model fit and can be adopted straightaway or with minor modifications to suit the business environment. Further, the results reveal the important sustainable supply chain management practices that can be adopted by restaurant business and improve their sustainable firm performance through adoption of suitable innovations. Additionally, as a scale, the construct will help the restaurateurs to self-test their business practice and improve their sustainable practices. The scale can also be adopted by policy makers to find out the serious factors causing sustainability issues of the sector.

7.3. Social Implications

The sustainability of the tourism industry and its supply chain has been challenged due to the outbreak of the COVID-19 pandemic. However, this is considered to be a short-term situation, and the industry is expected to bounce back and support economic resilience [110–112]. On the one hand, governments in tourism-dependent regions are framing policies for the sustainable recovery of the industry. On the other hand, technology adoption is gaining momentum in the industry [68]. However, earlier studies did not cover the restaurant supply chain management practices from the economic, environmental, and socio-cultural dimensions of sustainability. Thus, this study covers a broader view of SSCM practices that, when adopted, can reduce the negative social, cultural, economic, and environmental impacts upon restaurant businesses.

8. Limitations and Future Research, and Concluding Remarks

8.1. Limitations and Future Research

Similar to all questionnaire-based quantitative surveys, this study also comes with several limitations. The first major limitation is the sector selection. The food and beverage service sector can be classified into fine-dining restaurants in star hotels, stand-alone fine-dining restaurants, up-scale casual dining restaurants, casual restaurants, chains, fast-food restaurants, take-aways, and eateries. However, this research focused only on casual dining restaurants in one coastal tourist destination. Hence, the results are limited to theme-based seaside/seafood restaurants. However, the scale was constructed and kept as generic as possible; as such, it can be adopted by researchers from different domains. Therefore, the scale can be tested with different types of restaurants and at different types of destinations (downtown areas, hill stations, beach resorts, and so on). The second major limitation is the currently on-going pandemic situation which heavily affected the
population size of this study. Several restaurants were closed due to travel restrictions and the remaining restaurants were operating with limited seating capacity. Hence, the study can be conducted with a larger population, especially to find out the moderated mediation effects of socio-demographic factors which may shed more light on the needs of the industry at the destination/regional/national level. The third limitation is the sample demographic. The respondents selected for this study were only from Thailand. Thus, future research efforts may examine the model with a target population from other countries outside Thailand.

8.2. Concluding Remarks

The objective of this study was twofold—to develop a scale for assessing SSCM—INNO—SFP for the service sector, and to test the moderated mediation effects of socio-economic factors between them. This study succeeded in developing the scale for assessing SSCM practices, innovation adoption and SFP in the restaurant sector. Furthermore, it examined the direct and indirect relationships between the three and found the complete mediation effect of innovation adoption between the effects of SSCM and SFP, irrespective of socio-demographic moderators. These findings will support further theory development and testing in several tourism scenarios. Furthermore, it is hoped that the constructs will aid as a tool for restaurateurs to rethink and restructure their businesses in a sustainable manner.

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Institutional Review Board Statement: The Research Ethics Committee of Chiang Mai University has reviewed and issued the “Certificate of Exemption” (COE No. 033/64, CMUREC Code No. 64/102, Date: 9 June 2021) which was approved based on the International guidelines for human research protection including the Declaration of Helsinki, International Conference on Harmonization in Good Clinical Practice (ICH-GCP) and The Belmont Report.

Informed Consent Statement: Informed consent was obtained from all the respondents who participated in this study. All the respondents who participated in this study explained the study and its purpose. The anonymity and confidentiality of the data were maintained all the time.

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