Brief Report

Sustainability of Health and Fitness Information Platform Ecosystem

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Abstract: The roles of content producers, information receivers, and platform operators affect the stability of the governance of informational platforms. The purpose of this study was to identify and explore the sustainable factors of a platform ecosystem for health and fitness apps across Mainland China and Taiwan by interviewing producers, receivers, and operators. An advanced analytic hierarchy process (AHP) method was applied to derive expert perspectives from apps users and operators, live streamers, key opinion leaders, scholars, and officers across Mainland China and Taiwan via four dimensions and fourteen sub-dimensions of the initial health and fitness apps. The results revealed that the weights of the dimensions of health and fitness apps were sorted by content categories, content updates, user reviews, and platform terms; furthermore, the weights of the six highest sub-dimensions were the following: exercise, new feature, functionality, correctness, monitoring, and privacy. Content producers in Taiwan cared the most about the content category, whereas content producers in Mainland China cared the most about user reviews. Information receivers in Taiwan graded the content category the highest, whereas information receivers in Mainland China rated content updates the highest. Platform operators in Taiwan paid most attention to the platform terms, whereas the platform operators in Mainland China were most concerned with the content category. This comparative study can contribute to assisting the health and fitness industry across Mainland China and Taiwan area to provide an overall strategic operative process by identifying the effectiveness of the procedures, estimative processes, and cost reduction to enhance the competitiveness and further improve users' experiences and satisfaction for the sustainability of health and fitness information platform Ecosystem.

Keywords: content producers; information receivers; platform operators; information platform ecosystem; AHP; sustainability; Mainland China and Taiwan areas

1. Introduction

The Internet has made integrating and accessing information increasingly convenient, especially through mobile devices. Social network platforms connect users worldwide and enable them to build businesses, create content, and purchase products and services [1]. In recent years, information platforms for sports and health have emerged. These platforms use online technologies to monitor the user's health through mobile devices, organize communities, and interact with information stakeholders [2]. The aim of these platforms is to produce results that differ depending on user characteristics, information channels, and levels of acceptance and use [3]. There are obvious differences between Mainland China and Taiwan in terms of the development and consumption of information platform Ecosystem. With the frequent economic and cultural interaction between the two sides of the Taiwan Strait and the increase in cross-border interactive transmission on the information platform, sustainable consumption and production are very important. To achieve goal 12.a of the Sustainable Development Goals (SDGs) of the United Nations, namely, to strengthen

the scientific and technological capacity to move toward more sustainable patterns of consumption and production [4], practitioners have to be concerned about the sustainability of health and fitness information platform Ecosystem and to increasingly focus on their interaction with the variety of content and services that are available through different communication channels.

This study reinterprets the three roles played by platform operators, content producers, and information receivers in health and fitness apps according to the model of information platform Ecosystem [5]. Platform operators (operators) formulate terms of management and provide user interfaces to content producers and information receivers; content producers (producers) showcase their products and services in apps; information receivers (receivers) purchase these products or services and exchange opinions and information within the app [5]. The characteristics of these roles are as follows.

The role of producers is to transmit information to the receivers [6]. The producer can determine the information content, media interface, and characteristics of the recipient, and therefore, the choice of information varies depending on the personal characteristics, past information dissemination practices, organizational culture, external influences, and level of the social system [7,8]. Previous studies have noted that the attitude of the originator also affects the openness of information flow [9]. Information platform producers have been categorized as opinion leaders, trendsetters, connoisseurs, and viral marketers [9]. Producers differ in their attitudes, motivations, and expertise, and their organizational culture and values in relation to society are reflected in the choice of content, credibility of information, and relationship with receivers, which in turn affect how producers interact on the platform.

Receivers are interested in how information is collected, which affects the effectiveness of goal conversion [10]. Receivers are influenced by factors such as accessibility, comparability, their own characteristics, the usefulness of the information, and their education and socioeconomic status [11]. The information received by receivers affects the target conversion rate to an extent that depends on the current attitude, intention, behavior, and stage of change in the target behavior [6]. Different strategies can be used to disseminate information to receivers depending on the attitude and information familiarity [12]. The "message" behavior of platform receivers represents their willingness to actively express their own opinions or views on the message [13]. A study found that leaving a comment, as opposed to clicking like, meant that receivers were more willing to interact with the platform. Therefore, this study further analyzed user comments to analyze recipient behaviors with respect to the characteristics of receivers. The study found that operators could focus on gathering user feedback, which contains important information, to improve software quality and address gaps, suggesting that user feedback can help to improve apps [14]. Many app developers collect data on user satisfaction through various channels, such as focus groups, surveys, and bug reports, and app users can express their opinions about the app by posting comments on the platform through which the app is downloaded [15]. Most current exercise platforms promote a healthy lifestyle to receivers, and many researchers have been developing tools for measuring people's health literacy abilities in their daily lives to improve their health.

A platform's purpose is to improve the matching between users and facilitate the exchange of goods, services, or social currencies, thus creating value for all participants [16]. The objectives of constructing an information platform ecosystem include (1) enhancing data integration through the digital tracking of behavioral data through knowledge management and the analysis of behavioral and spatial relationships using geographic information systems; (2) optimizing user interfaces and reducing structural barriers through the visualization of information, use of voice technology, and inclusion of semantic web ontologies; (3) managing public relations. The objectives of constructing an information platform can become more challenging as new technologies emerge [17]. The emergence of the trend of information platform ecosystem transformation toward expanding the collaboration of economic agents is justified and digitalization helps to replace competition

with collaboration [18]. Interactive forms and data cascading have evolved from the Web 1.0 era, where receivers were mostly one-way and passive receivers of content, to Web 4.0, which emphasizes a wealth of content. Web 4.0 emphasizes big data applications in which information receivers can read or create content and then use information dissemination mechanisms, such as sharing features, to transmit them easily [19]. The use of a channel built with Web 4.0 concepts allows receivers to evaluate messages, maintain relationships with communicators, lead and seek a balance of opinions from receivers, and influence their intentions for further message delivery. The operator of the platform can determine the content and value of the message delivered [20], with the value being determined by the message's usefulness in each domain [21]. However, the emergence of the Internet has enabled producers to distribute diverse forms of information through multiple channels. In addition, because of the multiplicity of interactions between producers and receivers, the construction of information has become a cyclical and collaborative process [22]. Therefore, entertainment, informativeness, and social interaction are the main motives that influence how receivers behave after they have consumed information from a platform, in addition to the effectiveness of the platform controller [23]. The frequency of content updates, the topic content, the practical value, and the presence of multimedia messages influence how receivers behave.

According to a McKinsey & Company in China investigation, the coronavirus disease 2019 (COVID-19) pandemic has changed people's exercise habits and home online exercise has become a new trend. The online fitness industry has a 23% user growth rate and a 60% rate of willingness to continue use [24]. The worldwide flow of large volumes of information has greatly impacted the Ecosystem of health and fitness information platforms and has underscored the importance of understanding the intention to use apps from different backgrounds. This study aimed to clarify the perspectives of platform operators, information receivers, and content producers and to evaluate information quality and effectiveness on both sides of the Taiwan Strait. Specifically, it investigates the interactions among platform operators, content producers, and information receivers of a health and fitness information platform ecosystem in Mainland China and Taiwan.

This comparative study can contribute to the sustainable development of the health and fitness industry in both Mainland China and Taiwan by identifying the effectiveness of procedures, evaluated processes, cost reduction mechanisms, and approaches to enhancing competitiveness to further improve user satisfaction. Moreover, to evaluate the value of sports and health information, this study collected original data from platform operators, information receivers, and content producers. The relevance of health and fitness information on platforms in related enterprises and industries was estimated to enhance the input and output efficiency of the health industry.

2. Methods

2.1. Measurement

The analytic hierarchy process (AHP), which is a multilevel analysis method, was used to parse the problem into a dendritic structure to establish a class structure level, where each level influenced every other level; the AHP helps an individual or organization to choose the right course of action from a set of possible actions for various problems [25]. This study aimed to compare the perspectives of the operators, producers, and receivers of health and fitness apps in Mainland China and Taiwan. Based on a literature review, the measure developed by Li, Lee, Lai, and Huang (2020) was used to develop a questionnaire titled The Relative Weights of Sustainable Development of a Health and Fitness Information Platform Ecosystem [9]. After expert evaluations were conducted, four dimensions and fourteen sub-dimensions were obtained: (1) content category: monitoring, exercise, journaling, and sleeping; (2) user reviews: functionality, interactivity, and criticality; (3) content updates: new feature, correctness, and new language; (4) platform terms: privacy, accuracy, ownership, and right of use.

2.2. Participants

In the AHP analysis, due to the great subjectivity of expert scoring, to reduce the impact of this subjectivity on the decision-making results and improve the accuracy of the conclusions, the number of experts should preferably be at least five experts [26]. By the end of April 2020, the questionnaire surveyed opinions about the sustainability of health and fitness platform Ecosystem from three types of experts: six receivers who had experienced health and fitness apps for at least three years above, six producers who were key opinion leaders who had operated their social media for at least three years, and ten experts and scholars who represented operators, possessed a broad and in-depth competence in sport and tourism management, journalism and communication, and were internet platform operators with knowledge, skills, and experience through practice and education in a particular field. These participants engaged in a focus group interview. Subsequently, the weights of the dimensions were determined. Table 1 listed the backgrounds of these experts.

Table 1. The background of the panel members.

Type	Experts *	Specialty
Platform operators	1, F, 56, T	Sports and health management, track and field training
	2, F, 57, T	Sports philosophy, sociology, leisure, and health behavior
	3, F, 55, T	Welfare and long-term care for the elderly
	4, M, 56, T	Sports administration, sports affairs, school sports management
	5, F, 55, T	Tourism administration and planning
	6, M, 57, T	Sports policy, legal practice, and service consumption protection
	7, F, 28, M	Tencent platform operation analysis, business analysis major
	8, F, 28, M	Byte Dance platform operators, preventive medicine, aerobic exercise
	9, F, 31, M	Journalism and communication
	10, M, 29, M	New media operators: Wechat public account
Content producers	1, M, 43, T	Sports marketing, event management, international trade
	2, F, 27, T	Operating Facebook fan page related to heavy machinery
	3, M, 30, T	Running swimming YouTube sports platform
	4, M, 30, M	Weibo's KOL, layers, venture capital managers
	5, F, 31, M	Tiktok's KOL, new media operation
	6, F, 29, M	Weibo Vbloger, Tencent brand manager in marketing
Information receivers	1, M, 24, T	The Nike Training Club app user
	2, M, 24, T	30-Day Workout app user
	3, F, 23, T	Nike Run Club app user
	4, M, 42, M	Nike Run Club app user
	5, M, 24, M	30-Day Workout app user
	6, F, 40, M	Nike Run Club app user

* n, female or male, years of age, Taiwan or Mainland China.

2.3. Process

The AHP can be used to solve unstructured economic, social, and management science problems by systematizing complex and unstructured problems, decomposing them from a high level to a low level, and making quantitative judgments to simplify and improve the previous intuitive decision-making process. The higher the priority weight value, the higher the priority of the adopted solution, which can reduce the risk of decision errors [25]. For the problem evaluation, experts consider the weight of solutions as a reference for decision making [27]. Two items at each level with different measurements are compared, and the comparative matrices are paired; these can be established to calculate the number of featured vectors and to represent the priority of crucial elements at the structural levels [28]. The featured value is then calculated to serve as a basis for judging the level of consistency and extent of influence on each comparative matrix [29]. This is done by establishing an expert system for investigating the respective weights of a group of variables that are relevant to the research subjects [28]. This study used the AHP to determine each panelist's perspectives on health and fitness apps using the questionnaire. The AHP should be

conducted to avoid decision-making fatigue caused by the presence of too many weight comparisons among experts [30]. Each dimension had a maximum of seven questionnaires. The four steps for the AHP were as follows: (1) finalization of the evaluation criteria system, (2) questionnaire evaluation, (3) allocation of weighting and consistency clarification, and (4) calculation of the weighted values of each evaluation [29,31,32].

2.4. Data Analysis

The AHP method includes rating and comparison methods. One makes three general types of judgments to express importance, preference, or likelihood by establishing a reliable hierarchical structure or feedback network, influenced by environmental, social, political, and other factors and uses them to select the best option among alternatives [33]. In order to improve the reliability of the system and ensure the quality of the decision making [34], this study adopted a hybrid system based on AHP to create a comparison matrix to test the consistency of the dimensions. The method integrated the opinions of information recipients, content producers, and platform operators of health and fitness apps and calculated the weight of each indicator based on its importance after the focus group interviews, where participants discussed in depth the factors that influenced the importance of each dimension development. A two-by-two comparison of platform dimensions was conducted. The platform dimensions were divided into content categories, user comments, content updates, and platform terminology. The importance and hierarchy were determined using a two-by-two comparison between the four dimensions. Reliability was indicated when the consistency ratio (CR) was greater than 0.1.

3. Results

3.1. CRs of the Questionnaire

Based on the role interaction model for the health and fitness information platform ecosystem, this study divided platform analysis into four dimensions: content producer's content category and content updates, information receiver's comments, and platform terms. Weights were assigned to the four dimensions according to their importance. The AHP was conducted to investigate the opinions of the three types of experts on the health and fitness information platform ecosystem. In total, 22 valid questionnaires in the AHP were numerically encoded; these covered the 4 dimensions and 14 sub-dimensions that were used to survey the opinions of platform operators, content producers, and information receivers on the development of the health and fitness information platform ecosystem. All 22 questionnaires were valid with CR < 0.1 (Table 2).

Table 2. CRs of the questionnaires.

Dimensions	CR Values										
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**CP4**
Content category	0.10	0.06	*0.10*	*0.09*	0.07	0.09	0.05	0.06	0.04	0.05	0.05
User review	0.07	0.04	0.04	0.07	0.07	0.07	0.06	0.04	0.06	0.06	0.06
Content update	0.08	0.07	0.07	0.07	0.00	0.03	0.06	0.03	0.03	0.07	0.06
Platform terms	0.09	0.09	0.03	0.06	0.00	0.09	0.07	0.03	0.00	0.06	0.07

Dimensions	CR Values										
	CP1	**CP2**	**CP3**	**IR1**	**IR2**	**IR3**	**CP5**	**CP6**	**IR4**	**IR5**	**IR6**
Content category	0.09	0.05	*0.05*	*0.08*	0.10	0.08	0.04	0.08	0.09	0.09	0.09
User review	0.06	0.08	0.04	0.07	0.07	0.07	0.01	0.07	0.10	0.09	0.09
Content update	0.06	0.09	0.00	0.08	0.07	0.08	0.02	0.10	0.02	0.05	0.06
Platform terms	0.09	0.08	0.07	0.06	0.09	0.06	0.06	0.00	0.02	0.02	0.06

Note: PO: platform operators; CP: content producers; IR: information receivers.

3.2. Overall Weights Given by the Platform Operators, Content Producers, and Information Receivers

The Mainland Chinese experts' weights for the content category, platform terms, user review, and content updates dimensions of the health and fitness apps were 34.39%, 29.69%, 21.41%, and 14.51%, respectively; the Taiwanese experts' corresponding weights were 43.17%, 23.25%, 22.04%, and 11.52%, respectively. As indicated in Table 3, the six most influential sub-dimensions identified by the Mainland Chinese experts were exercise (17.04%), new features (16.49%), functionality (12.67%), correctness (10.40%), monitoring (10.29%), and privacy (6.67%), whereas the six most influential sub-dimensions identified by the Taiwanese experts were monitoring (19.84%), exercise (14.62%), functionality (12.10%), interactivity (8.71%), privacy (7.96%), and accuracy (7.60%) in Table 3.

Table 3. Overall assessment by the experts across Mainland China and Taiwan.

Dimensions	Sub-Dimensions	Mainland China Weight	Mainland China Sub-Weight	Mainland China Overall Weight	Rank	Taiwan Weight	Taiwan Sub-Weight	Taiwan Overall Weight	Rank
Content category	Monitoring	34.39	29.9	10.29	5	43.17	45.97	19.84	1
	Exercise		49.54	17.04	1		33.87	14.62	2
	Journaling		8.55	2.94	11		11.25	4.86	8
	Sleeping		12.01	4.13	9		8.89	3.83	10
User review	Functionality	21.41	59.19	12.67	3	23.25	52.05	12.1	3
	Interactivity		26.05	5.57	7		37.48	8.71	4
	Criticality		14.76	3.16	10		10.46	2.43	13
Content update	New feature	29..69	55.56	16.49	2	11.52	39.15	4.51	9
	Correctness		35.04	10.4	4		51.29	5.91	7
	New language		9.4	2.79	12		9.55	1.1	14
Platform terms	Privacy	14.51	45.98	6.67	6	22.04	36.11	7.96	5
	Accuracy		32.38	4.69	8		34.47	7.6	6
	Ownership		13.16	1.91	13		14.51	3.2	12
	Right of use		8.48	1.23	14		14.89	3.28	11
		100%	100%	100%		100%	100%	100%	

Note: Weights (%).

The Mainland Chinese producers' weights for the user review, content category, content updates, and platform terms dimensions of health and fitness apps were 27.57%, 26.91%, 23.76%, and 21.76%, respectively; by contrast, the Taiwanese producers' corresponding weights were 43.67%, 25.54%, 21.03%, and 9.77%, respectively. As indicated in Table 4, the six most influential sub-dimensions identified by the Mainland Chinese producers were functionality (16.08%), new features (13.75%), exercise (12.28%), privacy (11.41%), correctness (7.60%), and interactivity (6.84%), whereas the six most influential sub-dimensions identified by the Taiwanese producers were monitoring (43.68%), new features (14.85%), exercise (10.11%), interactivity (9.82%), functionality (8.48%), and correctness (7.17%) in Table 4.

The Mainland Chinese receivers' weights for content updates, content category, user review, and platform terms dimensions of health and fitness apps were 58.81%, 20.62%, 10.98%, and 9.59%, respectively; the Taiwanese receivers' corresponding weights were 63.17%, 17.51%, 9.89%, and 9.43%, respectively. As indicated in Table 5, the six most influential sub-dimensions identified by the Mainland Chinese receivers were new features (39.49%), correctness (14.99%), exercise (11.91%), functionality (7.79%), privacy (4.48%), and monitoring (4.37%), whereas the six most influential sub-dimensions identified by the Taiwanese receivers were exercise (35.72%), monitoring (18.01%), functionality (8.97%), interactivity (7.05%), correctness (5.24%), and journaling (5.13%) in Table 5.

Table 4. Assessment by the content producers across Mainland China and Taiwan.

Dimensions	Sub-Dimensions	Mainland China Weight	Mainland China Sub-Weight	Mainland China Overall Weight	Rank	Taiwan Weight	Taiwan Sub-Weight	Taiwan Overall Weight	Rank
Content category	Monitoring	26.91	25.38	6.82	7	43.67	49.99	43.68	1
	Exercise		45.61	12.28	3		23.16	10.11	3
	Journaling		8.67	2.34	14		14.51	6.34	7
	Sleeping		20.34	5.48	8		12.34	5.39	8
User review	Functionality	27.57	58.34	16.08	1	21.03	40.31	8.48	5
	Interactivity		24.78	6.84	6		46.72	9.82	4
	Criticality		16.88	4.65	9		12.97	2.73	12
Content update	New feature	23.76	57.89	13.75	2	25.54	58.15	14.85	2
	Correctness		32.02	7.6	5		28.08	7.17	6
	New language		10.09	2.39	13		13.77	3.51	10
Platform terms	Privacy	21.76	52.41	11.41	4	9.76	51.27	5	9
	Accuracy		17.7	3.85	10		29.04	2.83	11
	Ownership		13.33	2.9	12		12.65	1.23	13
	Right of use		16.56	3.61	11		7.04	0.69	14
		100%	100%	100%		100%	100%	100%	

Note: Weights (%).

Table 5. Assessment by the information receivers across Mainland China and Taiwan.

Dimensions	Sub-Dimensions	Mainland China Weight	Mainland China Sub-Weight	Mainland China Overall Weight	Rank	Taiwan Weight	Taiwan Sub-Weight	Taiwan Overall Weight	Rank
Content category	Monitoring	20.62	21.19	4.37	6	63.17	28.52	18.01	2
	Exercise		57.76	11.91	3		56.55	35.72	1
	Journaling		7.33	1.51	11		8.12	5.13	6
	Sleeping		13.72	2.83	9		6.81	4.3	8
User review	Functionality	10.98	70.99	7.79	4	17.51	51.22	8.97	3
	Interactivity		21.38	2.35	10		40.28	7.05	4
	Criticality		7.63	0.83	13		8.49	1.49	11
Content update	New feature	58.81	67.15	39.49	1	9.89	39.41	3.91	9
	Correctness		25.51	14.99	2		52.92	5.24	5
	New language		7.34	4.31	7		7.67	0.76	13
Platform terms	Privacy	9.59	50.71	4.88	5	9.43	52.46	4.95	7
	Accuracy		34.16	3.29	8		28.8	2.71	10
	Ownership		9.87	0.95	12		6.29	0.59	14
	Right of use		5.26	0.51	14		12.45	1.17	12
		100%	100%	100%		100%	100%	100%	

Note: Weights (%).

The Mainland Chinese operators' weights for the content category, content updates, user review, and platform terms dimensions of the health and fitness apps were 62.07%, 18.54%, 13.73%, and 5.66%, respectively; the Taiwanese operators' corresponding weights were 37.30%, 33.03%, 20.69%, and 8.98%, respectively. As indicated in Table 6, the six most influential sub-dimensions identified by the Mainland Chinese operators were monitoring (26.73%), exercise (24.85%), correctness (9.87%), functionality (9.78%), new features (6.75%), and journaling (5.58%), whereas the six most influential sub-dimensions identified by the Taiwanese operators were monitoring (18.16%), accuracy (13.36%), functionality (12.69%), exercise (9.22%), ownership (7.59%), and right of use (7.00%) in Table 6.

Table 6. Assessment by the platform operators across Mainland China and Taiwan.

Dimensions	Sub-Dimensions	Mainland China Weight	Mainland China Sub-Weight	Mainland China Overall Weight	Rank	Taiwan Weight	Taiwan Sub-Weight	Taiwan Overall Weight	Rank
Content category	Monitoring	62.07	43.05	26.73	1	33.03	54.98	18.16	1
	Exercise		40.02	24.85	2		27.93	9.22	4
	Journaling		8.97	5.58	6		9.82	3.25	9
	Sleeping		7.96	4.94	7		7.27	2.4	11
User review	Functionality	13.73	71.16	9.78	4	20.69	61.33	12.69	3
	Interactivity		15.92	2.18	9		29.3	6.06	7
	Criticality		12.92	1.77	11		9.37	1.94	12
Content update	New feature	18.54	36.41	6.75	5	8.98	34.12	3.06	10
	Correctness		53.25	9.87	3		57.88	5.2	8
	New language		10.34	1.91	10		8	0.72	13
Platform terms	Privacy	5.66	30.38	1.71	12	37.3	25.07	9.35	4
	Accuracy		47.95	2.71	8		35.81	13.36	2
	Ownership		14.69	0.83	13		20.36	7.59	5
	Right of use		6.98	0.39	14		18.76	7	6
		100%	100%	100%		100%	100%	100%	

Note: Weights (%).

4. Discussion

The results indicated that, in general, both the Mainland Chinese and Taiwanese experts valued the dimensions of the health and fitness information platform ecosystem slightly differently. Both types of experts gave the highest ranking to the dimensions of the content category but gave different rankings to the sub-dimensions, with the Mainland Chinese experts preferring exercise and Taiwanese experts preferring monitoring. The other dimensions ranked, from highest to lowest, by the Mainland Chinese experts were content updates, user review, and platform specification, and those ranked by the Taiwanese experts were user evaluation, platform specification, and content updates. This finding indicates that both types of experts differed in their views regarding the concept of platform governance, operators, producers, and recipients in all aspects of the sustainability of the platform. According to a participant, "this is also due to the inevitable result of the differences in politics, economy, environment, and culture between the two sides of the Taiwan Strait. If we can understand the factors behind the differences, it will be helpful to promote the sustainable development of the health and fitness app industry across the Taiwan Strait (PO9). " In the following, we discuss the perspectives of the three types of experts, namely, producers, receivers, and operators.

The Mainland Chinese producers gave higher weights to the dimension of user review and the sub-dimensions of functionality, new features, and exercise. The Taiwanese producers gave higher weights to the dimension of content category and the sub-dimensions of monitoring, new features, and exercise. The producers mostly engaged in content creation. However, the Taiwanese producers preferred the dimension of content classification and one such producer noted that "it is better for a health and fitness app to have recorded information and provide information on exercise and fitness (CP3)". By contrast, the Mainland Chinese producers preferred the dimension of user review and one such producer noted that "with a high level of competition, the most important thing for content creation is the opportunity to be able to meet the needs of fans with precision (CP6)". This result somewhat agreed with the basic operation of the platform ecosystem [5]. The producers focused on the nature of their products in health and fitness apps. However, to make their products meet the needs of receivers, the Mainland Chinese producers felt it necessary to fully grasp the feedback expressed in user reviews. By contrast, Taiwanese producers focused on the difference in product categories. The main reason was that the app platforms for health and fitness differed between Mainland China and Taiwan. The Mainland Chinese market was more competitive because it featured greater freedom in product development. Furthermore, the market shifted from being a product-oriented one to a consumer-oriented one, with no shortage of products. To become popular in the market, the Mainland Chinese producers also spent much effort in responding to feedback in user

reviews. By contrast, in Taiwan, the product market of health and fitness apps was mostly operated through agents, and the platform ecosystem was focused on the product's content. Producers on both sides of the Taiwan Strait considered new features and sub-dimensions to be important, presumably because when new features are added, they are accompanied by promotion and operation strategies to improve the app's exposure to receivers. By contrast, because exercise is always the core product of health and fitness platforms, it gains the favor of producers.

The Mainland Chinese receivers focused on content updates, especially those for new features and bug fixes, whereas the Taiwanese receivers focused on content classification. A Taiwanese receiver pointed out that "fitness app content updates are often expected (IR5)". Innovations in the health and fitness platform ecosystem in Mainland China have tended to slow down, and product users have greater expectations of health and fitness apps in not only innovativeness but also timely bug fixes. A Taiwanese receiver mentioned that "the product content of the exercise and fitness app can effectively help themselves, which is more important than helping others (IR3)". This indicates that the Taiwanese receivers focused more on the ability of health and fitness apps to promote health, especially in the content categories of exercise and monitoring. Because the essence of exercise lies in continuous exercise and monitoring, the health and fitness platform effectively encouraged users to exercise properly and live a healthy lifestyle. After people learned an exercise, they could use the health and fitness platform to track various quantitative metrics pertaining to their health and exercise. In addition, both the Mainland Chinese and Taiwanese receivers gave the lowest weight to platform terms. According to a receiver, "the monitoring project operates by collecting physical data through active input or passive device collection by the producers and users, and such items seem to be the basic functions that the platform should use every day (IR3)". We speculate that this finding was primarily due to recipients being in a vulnerable position in the platform ecosystem and being free to choose whether to use the platform. Although they know that health and fitness apps collect various personal data, most recipients do not worry about privacy if no substantial harm is done.

The Mainland Chinese operators found content categories to be important. According to one such operator, "continuous development and innovation within the product can only continue to attract users to maintain market share (OP8)". Compared with the Taiwanese operators, who emphasized the product content categories of health and fitness apps, the Mainland Chinese operators paid more attention to platform norms. This may be unique to how the platform ecosystem operates in Mainland China. According to a Mainland Chinese operator, "under the condition that it is not illegal, the platform specification cannot add too much benefit, and the company maintains a basic investment in this area (OP7)". Moreover, both the Mainland Chinese and Taiwanese operators were unanimous in their emphasis on monitoring. According to an operator, "data collection allows us to provide products that more accurately meet consumer needs (OP7)". These are the core competencies required of the platform to provide services, and the platforms must focus more on market demand.

5. Conclusions and Future Suggestions

Experts from both Mainland China and Taiwan emphasized the content category dimension for health and fitness platforms. Under the operation segmentation in the platform ecosystem, the Mainland Chinese producers gave a higher average weight to each dimension, whereas the Taiwanese producers gave a higher weight to the content category dimension. The Mainland Chinese receivers attached more importance to the content updates dimension, whereas the Taiwanese producers attached more importance to the content category dimension. The Mainland Chinese operators valued the content category dimension, whereas the Taiwanese operators valued the platform specification dimension (Table 7). The health and fitness information platform Ecosystem in Mainland China and Taiwan differ. Producers, receivers, and operators should not only focus on interacting with a variety of content and services offered through different communication

channels and understand their own ecosystem but also recognize the ecosystem of other information platforms to promote the success of their apps in their market, to play their respective roles well, and to promote the sustainable development of a health and fitness information platform ecosystem to achieve Goal 8 of the SDG, which promotes sustained, inclusive, and sustainable economic growth [35].

Table 7. Priority assessment in the information platform ecosystem across Mainland China and Taiwan.

Dimensions	Taiwan			Mainland China		
	CP	IR	PO	CP	IR	PO
Content category	1	1	2	2	2	1
Content update	2	3	4	3	1	2
User review	3	2	3	1	3	3
Platform terms	4	4	1	4	4	4

Note: PO: platform operators; CP: content producers; IR: information receivers.

The competitive world of computing has created so many related technologies to help address the many problems faced by platform operators that have accompanied the rise of capable devices in terms of guarding consumers against viruses and malware and protecting their security and privacy. These technologies give platform operators tremendous power and can be used to enhance and strengthen the market power and bottom line of platform maintainers in addition to protecting users [18]. This study was designed to ensure that fitness and health apps continue to satisfy their users and can continue to be sustainable businesses for platform operators by creating more flexibility and safeguards for producers and receivers without giving up important security protections. The managerial implications of this study are as follows. Platform operators should focus on the characteristics of health and fitness apps to shape perceptions of usefulness and ease of use because these encourage content producers and information receivers to use the app. They could do so by improving the apps' features by, for example, improving privacy, offering good design, and satisfying user demands [9]. Platform operators must continually develop new functionalities within their apps to enable content producers and information receivers to customize their experience such that they better enjoy their health and fitness apps [31]. Furthermore, the principles for designing a successful platform are the continuous exchange of information, services, and core values. It is of utmost importance to facilitate immerse interactions on a platform to encourage value exchange by using information about producers and receivers to match them effectively [16]. In today's market where content is king [34], content producers who generate a wealth of health and fitness content meet people's health needs and information receivers sustainably provide their feedback after use to respond to a desire for health to platform operators and content producers. The platform ecosystem can operate sustainably with cooperation among all actors.

Based on the interaction mechanism of the inter-actor information platform ecosystem [36], the limitation of our study was that we could not judge the interactions between content producers and information receivers across platforms. Follow-up analysis may involve the interaction between content producers and information receivers. Future studies may use Apple's iOS. This inclusion may allow researchers to compare user personas across the two platforms, namely, Android and iOS, to further elucidate platform interaction mechanisms.

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