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Article

Tourism industrial convergence effect: Insights from tourists visiting Macao

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Abstract: This study examines the rapid convergence of the tourism industry with other sectors, driven by the expanding experience economy. A conceptual model was introduced encompassing industry convergence patterns, paths, and effects to assess this convergence's effectiveness. Using a survey of 392 tourists in Macau, these findings reveal that the tourism industry convergence path and mode positively influence the convergence effect, thereby shaping tourists' perceived value. Moreover, this study identifies that convergence mode and effect mediate the relationship between the tourism industry convergence path and perceived value. This study validates the efficacy of industrial convergence paths and models in fostering regional industry convergence within the tourism sector. Additionally, it contributes a theoretical framework for evaluating industry convergence effects at a micro level, enhancing both the theoretical understanding and practical applications of Macao's tourism industry and industrial convergence theory.

Keywords: perceived value; tourism industrial convergence; convergence path; convergence model; convergence effect; Macau

1. Introduction

Industrial convergence develops a novel economic phenomenon with significant implications for industry growth and structure (Dong and Li, 2022; Klarin et al., 2021), particularly in the tourism sector (Katou and Katsouli, 2017). Within the dynamic landscape of the tourism sector, the concepts of convergence and innovation are central to the exploration, adoption, and implementation of novel ideas, processes, products, and services. Despite the vast body of literature available, the primary focus within the field often gravitates toward aspects such as products, markets, marketing strategies, management practices, and developmental processes. Notably, rigorous empirical research on tourism innovation remains scarce, as highlighted by researchers such as Hjalager (2002) and Sundbo et al. (2007), underscoring the untapped potential for innovation within the tourism industry. A few studies have delved into the convergence between tourism and other sectors, despite the observable occasions of convergence, particularly in domains like cultural and sports tourism. To address this gap, this article explores theories of industrial convergence through a strategic management lens, emphasizing the pressing need for further exploration and conceptualization in light of the existing literature constraints. Drawing on anecdotal observations in the ICT industry (Weaver, 2007), this discussion underscores the crucial role of industrial convergence in fueling regional tourism growth. Despite its significance, the tourism industry remarkably lacks comprehensive research on industrial development and regulation, underscoring the necessity for unique research

perspectives and methodologies tailored to the distinct characteristics of the sector. Consequently, there is a compelling need to explore the foundational industry convergence model conducive to successful tourism development. Additionally, the methods to evaluate the effects of industry convergence are paramount, given the current dearth of relevant research in this domain. In this context, new methodologies and interdisciplinary research approaches emerge as imperative to catalyze innovation within the tourism industry and unleash its full potential.

The current literature on strategic management predominantly focuses on the technical aspects of industrial convergence, neglecting the discussion on industrial structure transformation. However, industrial convergence can occur without technological convergence, emphasizing the critical role of strategic management in facilitating convergence between industries (Weaver, 2007). When the tourism industry converges with other sectors, it can lead to boundary-blurring and redefinition, creating new tourism sectors due to the lack of a clearly defined convergence scope in tourism sectors (Lanfant, 1980; Zhou and Sotiriadis, 2021). Griffin and Raj (2012) identified the growth of religious tourism, and Hjalager and Richards (2002) observed the expansion of gastronomic tourism. The tourism industry integrates its content and resources, fostering innovation and identifying new industries with economic value that offer additional benefits (Richards, 2018). To comprehensively understand the diverse facets of industrial convergence, further investigation is needed to contribute to existing theories and hypotheses, thereby building a strong foundation and broadening the theoretical framework. A new approach is required to balance industrial development with mature tourism while examining the growth of the tourism industry (Dong and Li, 2022). As the theory of industry convergence is still evolving, numerous gaps remain to be filled. This research aims to analyze how tourism industry convergence impacts industrial development and innovation through theoretical analysis, introducing a convergence path, model, and effect to establish a theoretical foundation for implementing industrial convergence in tourism.

Furthermore, research on industrial convergence has mainly focused on qualitative analysis, overlooking quantitative assessments of its extent within industries (Stezano, 2021). Assessing tourism industry performance from a macro perspective presents a considerable challenge (Bruni et al., 2017). While Bjerregaard (2010) emphasized the need for macro-level insights, concrete examples of convergence are lacking in case studies. Nevertheless, the tourism industry is transitioning towards the experience economy, driven by social and economic advancements, prioritizing superior services and experiences (Amaro et al., 2023; Martinez et al., 2010). This shift impacts tourism consumption patterns, emphasizing individual and affective needs (Mehmetoglu and Engen, 2011; Sharpley, 2019). Importantly, the convergence development of tourism with other industries is not only the antecedent of the tourist experience but also the consequences of the tourist experience. Therefore, customer perception should become one of the important indicators for evaluating the convergence effect of the tourism industry. Despite recognizing the influence of convergence on innovation, there is limited research on its impact on customer experience. To address this gap, this article introduces the concept of perceived value, examining the influence of industrial convergence on

customer experience at a micro-level to provide insights into the evolving tourism industry and its implications for customer satisfaction.

Overall, this study provides managers and academics with a better understanding of assessing the effectiveness of industrial convergence by incorporating tourists' perceived value into the analytical model. By reviewing the relevant literature and testing the proposed framework using examples from the tourism industry in Macau, this research aims to contribute to the theoretical development of the industrial economy. The convergence of tourism industries in Macau can be improved by implementing specific strategies that contribute to the tourism economic theory.

2. Literature

2.1. Tourism industry convergence and industry convergence

Industrial convergence originated in the 1970s alongside the advent of digital technology, fostering interoperability between various industries and ushering in new approaches in computing, printing, and broadcasting. Duysters and Hagedoorn (1998) argue that inter-industry communication establishes mutual service links, provides technical support for convergence, and fuels academic research. In today's economy, the integration and expansion of industries have become inevitable due to modern information technology (Tapscott, 1997). The primary study on industrial convergence focuses on computing, communications, and consumer electronics. The European Commission (Brussels, 1997) defines technological convergence as merging industrial alliances, technology network platforms, and markets. Similarly, Greenstein and Khanna (1997) characterize industrial convergence as the shrinking and disappearance of industrial boundaries to facilitate expansion, delineating two types: substitutive and complementary convergence. Furthermore, Malhotra (2001) describes industrial convergence as the merger of previously distinct industries, wherein competing companies may consolidate through functional and institutional convergence. Despite nuanced definitions, researchers concur that industrial convergence represents a novel economic phenomenon with significant implications for industry growth and structure (Klarin et al., 2021).

Tourism industry convergence involves creatively integrating traditional tourism resources and assets with those of other industries (Apostolakis, 2003). For instance, Kaini (2019) introduced agritourism as a strategy that combines agriculture and tourism to promote development. This sector encompasses various activities like farm stays, fruit picking, and specialized catering and lodging services offered on farms. Agritourism not only stimulates tourism growth but also adds value to agricultural products. Similarly, Ballestero et al. (2007) highlighted the importance of historical sites in advancing heritage tourism, focusing on mining regions in southern Spain. They emphasized these sites' role as key tourist attractions and stressed the need to integrate them into broader heritage tourism development frameworks. According to the research conducted by Lehto et al. (2022), collaborative initiatives between the exhibition and tourism industries can generate mutually beneficial outcomes. Exhibition tourism, a result of merging exhibition and tourism industries, has experienced significant growth in the tourism market, as demonstrated by empirical evidence (Lee and Kang, 2014).

Furthermore, the tourism industry demonstrates interconnections with nearly all other sectors, facilitating diversification into alternative industries to varying degrees (Crouch and Ritchie, 1999). Britton (1991) highlights the significant potential for expansion and growth in the tourism industry's supply. Its inherent characteristics make it highly adaptable to enhancing competitive advantage through convergence and expansion. Richards (2018) identifies two distinct types of convergence within the tourism industry: inter-industry and intra-industry penetration and overlap. This blurring of industrial boundaries can result in the shrinkage or even extinction of specific industries. While technological advancements pose challenges, they also offer opportunities for creating novel products and formats in the tourism sector. Extensive study of industry convergence with tourism is evident in works by researchers like Horng and Tsai (2012) and Oh et al. (2021). However, there remains a gap in understanding the convergence of regional industries within the tourism sector (Dong and Li, 2022).

2.2. Tourism industry convergence path, model, and effect

There is no precise definition of the Tourism industry convergence path, model, and effect. The industry convergence path is the trajectory by which industries amalgamate, integrate, or intersect over time, elucidating the progression and evolution of this process. It encompasses how various sectors coalesce and share technologies, resources, and practices, reshaping their boundaries and identities. Industrial convergence merges previously distinct industries (Greenstein and Khanna, 1997; Pennings and Puranam, 2001), sometimes blurring their boundaries ambiguously or distinctly, and may transpire within specific sectors (Stieglitz, 2003; Weaver, 2007). Kim and Jung (2013) proposed industry convergence categories based on academic disciplines, considering dimensions like industry expansion and benchmark technologies. Two primary paths of industrial convergence are technological and market convergence (Bröring and Leker, 2007), with technological convergence driven by technical factors and market convergence responding to market demands (Bröring et al., 2006). Socioeconomic changes may result in the merging of different industries, as seen in the convergence of manufacturing and service sectors. (Kim et al., 2015; Schmenner, 2009).

Industrial convergence manifests separately, categorized by Malhotra (2002) into pure, demand-driven, and supply-driven convergence. Hachlin and Marxt (2003) describe industrial convergence as the dialectical integration of value chain decomposition and reconstruction, viewed from a value chain perspective. Collins et al. (1998) emphasize both vertical complementarities within industry links and horizontal competition and substitution among industries. Alfonso and Salvatore (1998) delineate industrial convergence into technology, business, and market convergence stages. Additionally, Stieglitz (2002) further categorizes industrial convergence into technology and product alternatives and complements, employing evolutionary economics and industry life cycle theory. Gerum et al. (2004) applied Stieglitz's framework to analyze the mobile communication industry, assessing various forms of convergence in its development. Industrial convergence transformation stems from diverse industries converging, fostering ongoing

progression and innovation. Governments play a significant role in promoting regional industrial convergence (Kasinathan et al., 2022; Lall, 2003), often serving as key facilitators, while industry associations contribute significantly to regional industrial convergence (Chen et al., 2022; Mendez, 2020).

The tourism industry convergence model serves as a conceptual framework delineating how various sectors within tourism merge, integrate, or intersect. It elucidates the stages and factors involved in converging within other tourism-related divisions like hospitality, transportation, attractions, and destination management. Weaver (2007) introduced a model comprising two modes for industry convergence. In one mode, industries A and B converge to form a new industry AB, potentially with distinct yet definable boundaries. This can lead to the emergence of permanent, semi-converged, or overlapping industries, where sub-segment AB is shared by both original industries A and B and the new industry AB. An example is the convergence of television and the internet (Dowling et al., 1998). The second mode involves A absorbing B or vice versa, exemplified by sports tourism during the Olympic Games, where sports and tourism intertwine as tourists travel to Olympic venues. Post-games, sports events, and venue tourism converge, focusing on sports-related attractions and facilities (Gold and Gold, 2024).

Convergence and innovation are integral to achieving external convergence within the tourism industry. Yuan et al. (2022) classify convergence based on innovation degree as update convergence, penetration convergence, and radical convergence. Renewal convergence involves transforming tourism products and their counterparts to create innovative, integrated formats (Richards and Marques, 2012). Utilizing tourism to convert agricultural resources into tourist attractions fosters mutual benefits and industrial convergence. Infiltration and convergence integrate tourism products with the agronomic foundation (Richards and Wilson, 2006). Reorganization and convergence entail restructuring and integrating tourism offerings and services to create new cohesive formats (Li and Kovacs, 2021). Examples include spa tourism (Smith, 2013), cultural tourism (Tan et al., 2016), and academic tourism (McGladdery and Lubbe, 2017).

The tourism industry convergence effect refers to the impact and outcomes arising from the merging, integration, or overlap of various sectors within the tourism industry. This effect has positive and negative consequences on stakeholders, businesses, destinations, and the general tourism ecosystem. Estabrooks (1995) examines the responses of computing companies, communications, media, entertainment, and financial services industries to regulatory and technological shifts resulting from industry convergence, emphasizing scale economies and diversification strategies stemming from cross-industry convergence. Brännback et al. (2002) conducted a case study on the convergence of pharmaceutical and nutritional/health food industries to analyze its effects on innovation strategies across sectors. Moreover, industrial convergence, as argued by Antonioli and Mazzanti (2009), can deliver cost-saving benefits for individual enterprises at the micro level. This is achieved through enhanced shared asset utilization, fostered product and industrial innovation, and contributions to macro-level economic and social development. These factors work together to upgrade industrial structures and adopt sustainable economic growth. Dawid et al. (2014) delineate various effects of industrial convergence, including the

innovative optimization effect, competitive structure effect, organizational structure effect, competitive ability effect, and consumption ability effect.

Furthermore, the convergence effect in the tourism sector pertains to the outcomes stemming from such convergence, encompassing the effects and trends of convergence within the industry (Faulkner and Tideswell, 1997; Pencarelli, 2020). The extent and scale of these effects in the tourism industry can be classified into three levels (Elkington, 1997). At the macro level, those impacts extend broadly across society, affecting the economy, society, culture, ecology, and diplomacy. This convergence is evidenced by its dynamic effects on the economy. The middle-level effect manifests in politics, society, cultural convergence, etc. (Katz, 1996; Van der Borg et al., 2005). At the micro-level, businesses within the tourism industry are influenced by factors such as industry classification, business format, geographical location, and brand identity. This is demonstrated by effects like format upgrading, promotional effectiveness, regional collaboration, and brand cultivation (Weaver, 2007). Micro-effects of tourism industry convergence are observed at the organizational level, encompassing resources, products, markets, and enterprises, materializing in resource amplification, product innovation, market enhancement, and convergence (Lee et al., 2011). The convergence effect in the tourism industry should result in the entrance of new services, activities, and experiences (Bröring and Leker, 2007; Chen et al., 2022; Su et al., 2019). Consequently, the effects of various convergence paths and models in the tourism industry contribute to the resulting convergence effect. Based on the literature analysis, the following hypotheses are proposed:

H1: The tourism industry convergence path positively impacts the convergence model.

H2: The tourism industry convergence path positively impacts the convergence effect.

H3: The tourism industry convergence model positively impacts the convergence effect.

2.3. Tourism industry convergence path, mode, effect, and perceived value

(See **Figure 1**) The convergence of the tourism industry has reshaped competitive and cooperative dynamics among original industrial enterprises, leading to the blurring and, at times, redrawing of industrial boundaries (Andreas, 2003; Atluri et al., 2017). This shift significantly influences industrial growth and structure, compelling enterprises to adapt to new technologies, customers, and demands. The profound impact of industrial convergence on economic development, industrial organization, and corporate strategy has garnered increasing attention (Pennings and Puranam, 2001), making it a critical topic of study. Researchers have proposed various paths for the convergence of the tourism industry from different perspectives, including convergence through resources, technology, markets, and functions. Geum et al. (2016) identified four types of industry convergence: technology enhancers, policy-driven environment enhancers, service-integrated social business generators, and technology-driven new value generators.

Moreover, the use of services and social enterprises plays a significant role when the service industry becomes the focal point of industrial convergence, with implications closely tied to social business. The connections between increased service and social enterprise are evident in the product-service system (González-Torres et al., 2021; Martinez et al., 2010). Industrial convergence is a multifaceted phenomenon encapsulating two crucial dimensions: value and convergence effect. It has the potential to enhance existing value and create novel value propositions, with disruptive innovation associated with generating novel value and incremental innovation linked to pre-existing value. Value generation is often seen as a primary driver of convergence. As highlighted by the study of Hacklin et al. (2009), technological convergence can give rise to a proliferation of interrelated and intersecting technologies. This, in turn, presents opportunities for novel value creation and business model innovation, as noted by Hacklin et al. (2009), Kawashima (2002), and Ralph and Graham (2004). Additionally, the convergence effect encompasses the value generated by merging different industries, often understood through the "triple bottom line" concept, considering economic, social, and environmental factors (Elkington, 1997). Findings from the experience economy literature indicate that the perceived value in tourism is influenced by diverse convergence effects, which in turn shape tourists' travel intentions (Chang et al., 2014).

Perceived value refers to a consumer's comprehensive assessment of a product's usefulness, considering the cost incurred and the benefits received (Zeithaml, 1988). McDougall and Levesque (2000) adopt Zeithaml's definition and assert that consumers' perceived value is their comprehensive assessment of the benefits they receive about the costs they incur. Perceived value is a complex construct, not a singular dimension. Grewal et al. (1998) divide perceived value into two components: acquired value and interaction value. Woodruff (1997) posits that customers' perceived value can be categorized into two distinct stages: expected value and acquired value. These stages correspond to different phases of the purchasing process, namely during the purchase and after the use of products or services. Furthermore, Parasuraman and Grewal (2000) categorize perceived value into four distinct types: acquisition value, transaction value, use value, and redemption value. The first two manifest during the purchase stage, while the latter is reflected in the usage stage. According to the studies conducted by Sheth et al. (1991) and Sweeney et al. (2001), the perceived value scale comprises four dimensions: emotional value (comprising four indicators), social value (comprising four indicators), functional value (comprising four indicators related to monetary price or value), and functional value II (comprising six indicators related to product outcome or perceived quality). This classification methodology has a significant impact on the academic community. Contemporary empirical studies in the tourism and hotel industries adopt this perspective to understand tourists' perceived value. This classification method is employed to ascertain the functional value by assessing the perceived value. Deng et al. (2011) also emphasize the importance of emotional and social value in the assessment of overall perceived value. Applying the theory of perceived value to tourism and festival study, researchers have proposed various dimensions of perceived value based on different research contexts. However, in general, the majority of studies consider functional value (utilitarian value), emotional value (hedonic value), and

social value as significant constituents of tourists' perceived value (Akaraputipun and Eiamkanchanalai, 2010; Song et al., 2015).

Furthermore, Gallarza and Saura (2006) emphasized that perceived value is a pivotal mediator between product quality and customer satisfaction. The perceived value has a positive impact on overall satisfaction, which subsequently influences tourist loyalty. Lee et al. (2007) further categorized tourists' perceived value into three dimensions: overall, functional, and emotional. Their study of the Korean Demilitarized Zone (DMZ) reveals that overall perceived value exerts the most substantial influence on destination satisfaction, followed by functional and emotional value. Chen and Chen (2010) investigate the relationship between experience quality, perceived value, satisfaction, and behavioral intentions of cultural heritage tourists. Their study demonstrates that perceived value can directly impact destination satisfaction, which subsequently influences behavioral intention. Kim and Choe (2019) have developed a modern festival tourist perception measurement scale, including seven dimensions: functional, service, social, aesthetic/hedonic, emotional, experience, and environmental atmosphere value. Therefore, the tourism industry's convergence path, mode, and effect can be evaluated based on the perceived value attributed by tourists. Based on the literature review above, this study proposes the following research hypotheses:

H4: Tourism industry convergence model positively impacts perceived value.

H5: Convergence effect positively impacts perceived value.

H6: Tourism industry convergence model mediates convergence industry path toward perceived value.

H7: The tourism industry convergence effect mediates the industry convergence path toward perceived value.

H8: The tourism industry convergence mode and effect sequentially mediate the industry convergence path toward perceived value.

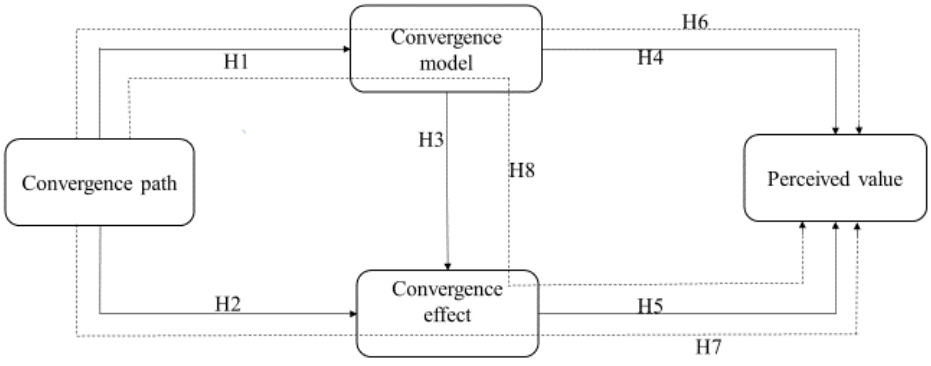

Figure 1. Conceptual model.

3. Methodology

3.1. scale

The measurement of the industry convergence model was primarily based on Weaver's (2007) literature with three measurement items (i.e., new activities attracted me to this tour). The measurement of convergence path was based on the works of

Kasinathan et al. (2022), Chen et al. (2022), and Mendez (2020), which have been widely recognized by diverse industry convergence paths, including enterprises, governments, and other organizations, with seven items (e.g., new activities promoted by the government are easy to attract me.) The measurement of the industry convergence effect was primarily based on the service innovation evaluation index developed by Kitsios and Grigoroudis (2020) with six items (i.e., Whether tourists visit Macau to experience new forms of entertainment and leisure.). The measurement of perceived value was primarily referred to the scales of (Chang et al., 2014) and (Kim and Choe, 2019) with eight items (i.e., Whether it is worth spending money in Macau or not). To ensure the validity of the content, a back-translation method was employed (Beaton et al., 2000; Son et al., 2000). The measurement instrument was first developed in English and subsequently translated into Chinese by two bilingual professionals proficient in both languages. The revised questionnaire was created utilizing a 5-point scale for the ultimate survey.

PLS is better suited to explaining complex relationships because it avoids two problems: unacceptable solutions and factor uncertainty (Fornell and Bookstein, 1982). Another statistical tool used in this study is IBM Statistical Product and Service Solutions (SPSS). PLS-SEM evaluation followed the recommended two-step systematic evaluation approach. First, the measurement model was evaluated, followed by the structural model (Hair et al., 2013). The research model was tested using Smart PLS 3.2.9.

3.2. Sample

Mainland China's rapid economic expansion has increased the number of tourists who visit Macau for sightseeing due to its unique historical and cultural heritage. The Macau SAR government is dedicated to positioning Macau as a world center of tourism and leisure, concentrating on promoting diversified growth in the gambling and tourism industries. These activities involve promoting conferences, trade shows, sports events, and cultural tourism. The government, enterprises, and other institutions are committed to promoting the diversified development of tourism and the convergence of related industries in Macau.

Before the formal investigation, of 51 tourists a pre-test analysis of the questionnaire was conducted to eliminate invalid items and enhance reliability and validity. According to the results of the pre-test analysis, the questionnaire was appropriately revised to create a formal questionnaire, which was then officially distributed. The questionnaire was designed with closed-ended questions and random sampling. The survey team consisted of 4 people who targeted adult tourists visiting various ports and resorts in Macau. Based on the judgment of the survey personnel supervisor, the target participants were identified as mainly adult tourists. Before filling in the questionnaire, the survey team asked the participants whether they were tourists and obtained their informed consent to participate in the survey. The survey was randomly distributed to tourists who visited Macau from 22 January 2023, to 1 March 2023. A total of 450 questionnaires were distributed, but 51 were incomplete and 17 were missing. 392 valid questionnaires were collected, resulting in an effective response rate of 84.6%.

3.3. Measurement

Table 1 below displays the fundamental data of the sample including gender, marital status, age, education level, monthly income, travel mode, travel purpose, length of stay, and frequency of visits (see **Table 1**). According to the normal distribution test, the absolute value of skewness of all measurement items was less than 3, and the absolute value of kurtosis was less than 10. It can be found that the distribution of sample objects is relatively balanced, and there is no excessive deviation (Gao et al., 2008).

Table 1. The sample description (n = 392).

Item	Variable	Number of Samples	Percentage (%)
gender	Male	200	51
	Female	191	48.7
Age	Under 25	75	19.1
	26~34	86	21.9
	35~45	144	36.7
	46~59	73	18.6
	60 and above	14	3.6
Marriage	Unmarried	137	34.9
	Married	255	65.1
Education	Junior high school or below	44	11.2
	High school	66	16.8
	Junior college	87	22.2
	Undergraduate	162	41.3
	Master or above	33	8.4
Income (CNY: Y)	3000 below	38	9.7
	3000~4999	52	13.3
	5000~9999	148	37.8
	10,000~19,999	101	25.8
	20,000 and above	53	13.5
Travel purpose	Leisure vacation	241	61.5
	Learn about the history and local culture	28	7.1
	study or work needs	26	6.6
	travel with others	40	10.2
	Take children to increase their knowledge	33	8.4
	Others	24	6.1
Travel form	Travel agency group	9	2.3
	Travel with family and friends	271	69.1
	Travel alone	74	18.9
	Business trip	9	2.3
	others	29	7.4

Table 1. (*Continued*).

Item	Variable	Number of Samples	Percentage (%)
Length of stay	1 day	27	6.9
	1–2 day	69	17.6
	2–3 day	194	49.5
	Within 1 week	84	21.4
	1 week and above	18	4.6
Visit frequency	Once	108	27.6
	Twice	142	36.2
	Three times and above	142	36.2

In this study, the internal reliability of the questionnaire was assessed using Cronbach's alpha. Cronbach's alpha was 0.907 for the convergence path, 0.761 for the convergence mode, 0.855 for the convergence effect, and 0.901 for the perceived value. Cronbach's alpha coefficients for each latent variable were above 0.7, indicating good reliability and internal consistency of the questionnaire. The overall variance explained in the questionnaire's common method variance (CMV) test was 29.343 less than 50%. There was no issue with common method bias.

Table 2 shows that all latent variables have a combined reliability (CR) value higher than the critical value of 0.7, indicating good reliability of the measurement model after analysis. The model's validity was tested through a convergent and discriminant validity test. The factor loading values for each observation index ranged from 0.708 to 0.893, all exceeding 0.5, with *p*-values below 0.001. The average extraction variance of each latent variable ranged from 0.619 to 0.679, all exceeding 0.5. This shows that the measurement model has strong convergent validity.

Table 2. The results of confirmatory factor analysis (CFA).

Variables	Item	Loading	*z*-value	CR	AVE
Perceived Value (PV)	Tourism in Macau is worthy of its name	0.708	25.131	0.929	0.619
	Macao tourism impressed me	0.764	44.671		
	Macao tourism services improved	0.827	48.432		
	Macao tourism facilities are upgraded	0.843	39.666		
	I have a soft spot for Macau	0.795	39.682		
	Macao's tourism landscape has been improved	0.800	29.652		
	The Macao environment is better	0.778	39.527		
	Worth it to spend in Macau	0.773	25.131		
Convergence path (CP)	I am more likely to be attracted to new tourist-oriented activities	0.782	38.22	0.926	0.643
	New activities promoted by tourism companies are easy to attract me	0.784	36.754		
	I am easily attracted to new activities promoted by other organizations	0.829	51.166		
	New activities promoted by the government are easy to attract me	0.809	41.218		
	New activities of local tourism resources are easy to attract me	0.816	41.931		
	Tourism companies jointly promote new activities easy to attract me	0.782	30.674		
	Related industries promote new activities easily attract me	0.809	39.036		

Table 2. (*Continued*).

Variables	Item	Loading	*z*-value	CR	AVE
Convergence effect (CE)	Are you coming to Macau to experience new entertainment and leisure?	0.757	24.097	0.896	0.633
	Are you coming to Macau to experience new activities?	0.844	41.567		
	Are you interested in the new culture of Macau?	0.839	39.129		
	Do you mainly go to Macau for shopping?	0.727	26.805		
	Would you like to participate in more experiential activities?	0.803	24.855		
Convergence model (CM)	New activities attracted me to this tour	0.786	30.38	0.863	0.679
	New activities and travel together attracted me	0.893	89.079		
	Travel attracts me to new activities	0.788	25.536		

Note: * $P < 0.05$; ** $p < 0.01$.

According to Fornell and Larcker (1981), a composite reliability value above 0.7 indicates a good construct's convergent validity. Therefore, an AVE score above 0.5 was preferred. The square root of AVE (refer to **Table 3**) had a higher value than the construct's correlation with other constructs, indicating strong convergent validity (Hair et al., 1998). All constructs reported an AVE score above 0.5. Additionally, the square roots of AVE for each construct were significantly higher than the correlation squares of other constructs. This shows that the measurement has a strong discriminant validity.

Table 3. Mean values, stand deviation, and correlation coefficient (n = 392).

Item	MD	SE	1		2	3
CE	3.841	0.552	0.795			
PV	3.896	0.513	0.43**	0.802		
CM	3.985	0.506	0.577**	0.501**	0.787	
CP	3.739	0.607	0.386**	0.612**	0.586**	0.824

* $p < 0.05$; ** $p < 0.01$; AVE square root; CE = convergence effect; PV = perceived value; CM = convergence model; CP = convergence path.

Finally, the model's fit value reported an SRMR of 0.067, an NFI of 0.819, and an RMS -theta of 0.146. The confirmatory factor analysis in this paper indicates a good overall fit of the model, meeting all standard indicators.

4. Results

This study assumes that the bootstrapping method in Smart PLS 3.2.9 software simulates repeated sampling of the sample 5000 times. The structural model was estimated using the original data sample and numerous additional samples. The findings in **Table 4** confirm the hypotheses proposed in this paper regarding the influence of convergence path on convergence mode, convergence effect, and perceived value. Thus, H1, H2, H3, H4, H5, H6, H7, and H8 were supported. The path coefficient of the proposed model is displayed in **Figure 2**.

Table 4. Path analysis.

Hypotheses	Path	Unstandardized estimates	S.E.	z (C.R.)	*p*	VAF	Results
H1	CP → CM	0.612	0.037	16.636	**		supported
H2	CP → CE	0.310	0.067	4.651	**		supported
H3	CM → CE	0.196	0.063	3.115	*		supported
H4	CM → PV	0.427	0.046	9.345	**		supported
H5	CE → PV	0.412	0.045	9.213	*		supported
H6	CP → CM → PV	0.261	0.034	7.657	**		supported
H7	CP → CM → CE	0.120	0.040	2.995	*		supported
H8	CP → CM → CE → PV	0.049	0.018	2.818	*	0.570	supported

*p < 0.01; **p < 0.001; CE = convergence effect; PV = perceived value; CM = convergence model; CP = convergence path.

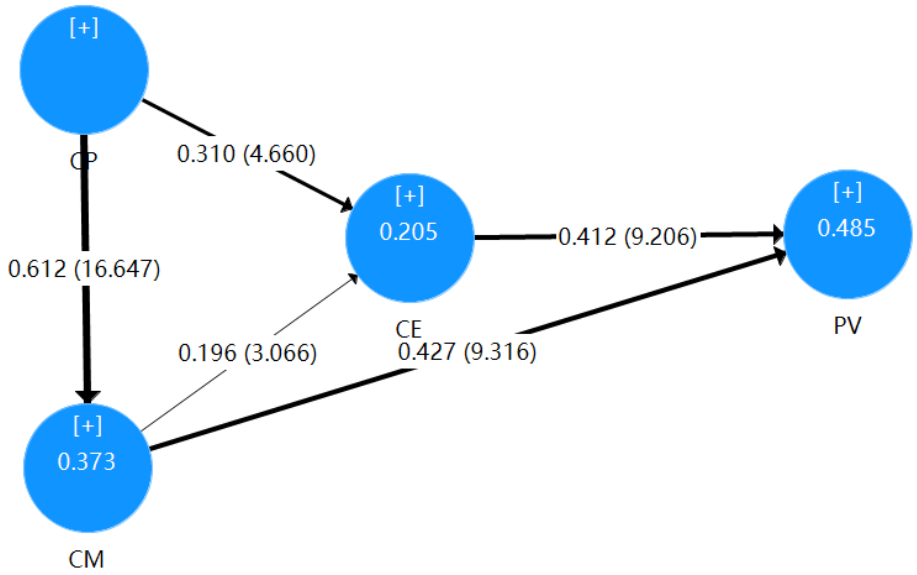

Figure 2. Model path.

5. Discussions and implications

The present study reviewed the current literature and presented a theoretical framework for the convergence of the tourism industry and its influence on tourists' perceived value, with a particular perspective on value creation. By investigating the impacts of industrial convergence on tourists from a micro-level perspective, and utilizing empirical analysis, the study also examined the path, mode, and effect of the convergence mechanism in the tourism industry in Macau. The mechanism behind the convergence effect supports the proposed hypothesis. The detailed analysis and conclusions are as follows:

5.1. Discussions

First, the results of this study reveal a positive relationship between the tourism industry's convergence path and the convergence effect, indicating that various

convergence paths among enterprises, governments, and other organizations within the tourism sector contribute positively to the overall convergence effect. This finding aligns with the conclusions drawn by previous studies conducted by Hachlin and Marxt (2003) and Collins et al. (1998), which similarly emphasized the importance of convergence paths in shaping convergence outcomes. Consistently, the findings corroborate the conclusions drawn by Lall (2003), Kasinathan et al. (2022), Chen et al. (2022), and Mendez (2020), further supporting the notion that convergence paths play a crucial role in determining the effectiveness and impact of industrial convergence within the tourism industry. Furthermore, the results indicate that the convergence model employed in the tourism industry positively influences the convergence effect, suggesting that different convergence models can have varying effects on the overall convergence outcomes. This observation is in line with the findings of Antonioli and Mazzanti (2009), Dawid et al. (2014), Weaver (2007), Lee et al. (2011), Bröring and Leker (2007), as well as recent studies by Chen et al. (2022) and Su et al. (2019). These studies collectively highlight the importance of adopting appropriate convergence models tailored to the specific context and objectives within the tourism industry to optimize convergence outcomes and maximize the convergence effect. Moreover, the results also indicate a positive impact of the convergence model on the convergence path within the tourism industry. This suggests a correlation between the industry convergence model employed and the trajectory of convergence within the sector. This finding resonates with previous studies by Weaver (2007), Yuan et al. (2022), Kayumovich (2019), and Li and Kovacs (2021), which emphasize the role of convergence models in shaping the direction and pace of convergence paths within industries. Thus, selecting an appropriate convergence model becomes essential for guiding and facilitating the convergence path in the tourism sector, ensuring alignment with overarching goals and objectives for sustainable growth and development.

Second, the findings underscore a positive relationship between the tourism industry's convergence model and perceived value, indicating that the convergence model employed within the tourism sector can significantly influence tourists' perceived value. This observation underscores the dynamic interplay between the evolving needs and expectations of tourists (Pennings and Purannam, 2001) and the strategic decisions made in the design and implementation of industry convergence models. This aligns with the conceptualization of convergence value articulated by Geum et al. (2016), Hacklin et al. (2009), Kawashima (2002), and Ralph and Graham (2004), which emphasizes the importance of convergence initiatives in shaping perceived value for tourists. Furthermore, the results suggest that the tourism industry's convergence path also positively impacts perceived value, indicating that the trajectory of convergence within the tourism sector can influence tourists' perceptions of value. This finding underscores the nuanced relationship between convergence pathways and their impact on the overall convergence effect (Elkington, 1997; Hacklin et al., 2009). The convergence path followed by the tourism industry may vary depending on the specific convergence effect, thus highlighting the need for strategic alignment between convergence pathways and desired outcomes to enhance perceived value for tourists. Moreover, the findings of this study reveal that the tourism industry's convergence effect positively influences perceived value,

suggesting that the emergence of a converged tourism industry should align with the delivery of innovative services, activities, and experiences that resonate with tourists' preferences and expectations. This resonates with previous studies by Bröring and Leker (2007), Chen et al. (2022), and Su et al. (2019), which have explored the link between tourism convergence and perceived value. Additionally, studies such as those conducted by Chen and Chen (2010) and Kim and Choe (2019) have further delved into the relationship between tourism offerings and tourists' perceptions of value, highlighting the importance of delivering unique and compelling experiences to enhance perceived value and satisfaction.

Third, the results of this study reveal that the tourism industry's convergence model mediates the relationship between the convergence path and perceived value. This suggests that the type of convergence model adopted by the industry plays a crucial role in shaping the link between the convergence path and the ultimate perceived value experienced by tourists. The results of this study also indicate that the tourism industry's convergence effect mediates the relationship between the convergence path and perceived value. This highlights the importance of the actual outcomes or effects of the convergence process in determining how the convergence path translates into perceived value for tourists. The convergence effect, which may include factors such as the integration of resources, the creation of novel offerings, or the emergence of new business models, can significantly influence the tourists' perceived value of the tourism experience. Furthermore, the results of this study uncover a sequential mediating effect, where the convergence path and perceived value are observed to mediate the relationship between the tourism industry's convergence process. This suggests a more intricate and dynamic interplay among the various elements of industrial convergence, where the path or trajectory of convergence, the adopted convergence model, and the resultant convergence effect collectively shape the ultimate perceived value for tourists. The findings suggest that the convergence path and mode influence the convergence effect, which in turn impacts tourists' perceived value. Therefore, perceived value emerges as a consequential variable within the industrial convergence mode, path, and effect framework.

Finally, the study's model interpretation, as depicted in **Table 4**, indicates a coefficient of determination (R2) of 0.57 for value perception, signifying a relatively high level of overall explanatory power. This underscores that the theoretical framework proposed in the study effectively captures the dynamics of the industrial convergence path, mode, effect, and underlying mechanisms influencing perceived values within the tourism industry. These insights contribute to a comprehensive understanding of how industrial convergence processes shape tourists' perceptions and experiences, thereby guiding strategic decision-making and fostering value creation in the tourism sector.

5.2. Theoretical implications

This paper draws inspiration from existing theories and literature on industrial convergence and proposes a novel evaluation model to measure it. Based on the experience economy theory, this article examines the path, mode, and effects of

industrial convergence on a micro level. A comprehensive study is underway to explore industrial economic theories, and a fresh effort is being made to examine the tourism industry. The study findings demonstrate that this theoretical framework has strong explanatory power.

Additionally, the findings suggest a nuanced understanding of the relationship between convergence paths and the convergence effect within the tourism industry. While previous studies have often underscored the significance of convergence paths, the present investigation provides empirical evidence demonstrating their positive influence on the overall convergence effect. This contributes to theoretical advancements by confirming the significance of convergence paths in shaping convergence outcomes.

Moreover, the study sheds light on the influence of different convergence models on the convergence effect within the tourism sector. By identifying a positive impact, the study emphasizes the need for customized convergence models that align with specific industry contexts and objectives. This extends existing theoretical frameworks by emphasizing the role of convergence models in optimizing convergence outcomes and maximizing the convergence effect.

The evidence of the mediating role of convergence models and convergence effects in the relationship between convergence paths and perceived value adds depth to theoretical understanding. This highlights the complex interplay between different elements of industrial convergence and their ultimate impact on tourists' perceptions. It enriches theoretical discourse by elucidating the mechanisms through convergence processes influencing perceived value in the tourism sector. Therefore, a new theory can be developed to assess the industry convergence in the micro-lever to provide insights into the evolving tourism sectors.

5.3. Practical implications

The study's findings reveal the mediating role of the tourism industry's convergence model and convergence effect in the relationship between the convergence path and perceived value. The findings provide practical insights for stakeholders in the tourism industry with strategic plans and implementation of convergence initiatives. The positive relationship between the tourism industry's convergence paths and the convergence effect highlights the significance of fostering collaboration and alignment among various stakeholders, including enterprises, governments, and organizations within the tourism sector. Tourism businesses and policymakers should actively work to establish and nurture convergence paths that may effectively integrate resources, knowledge, and capabilities across the industry. Adopting appropriate convergence models tailored to the specific context and objectives of the tourism industry can optimize convergence outcomes and maximize the overall convergence effect.

Moreover, the positive impact of the tourism industry's convergence model on perceived value underscores the importance of designing and implementing convergence strategies that resonate with tourists' evolving needs and expectations. Tourism businesses should carefully consider the convergence model they employ to ensure it enhances the delivery of innovative services, activities, and experiences that

meet or exceed tourists' perceptions of value. Aligning the tourism industry's convergence pathways with the desired outcomes, such as increased perceived value, can help enhance the overall attractiveness and competitiveness of the tourism offerings. This implies that industry stakeholders should carefully consider selecting convergence models to align with their goals and objectives, thereby optimizing convergence outcomes and enhancing the convergence effect.

Finally, by recognizing the positive impact of convergence paths, models, and effects on perceived value, industry practitioners can focus on delivering innovative services, activities, and experiences that resonate with tourists' preferences and expectations. Tourism businesses should carefully consider the convergence model they employ to ensure it enhances the delivery of innovative services, activities, and experiences that meet or exceed tourists' perceptions of value. Aligning the tourism industry's convergence pathways with the desired outcomes, such as increased perceived value, can help enhance the overall attractiveness and competitiveness of the tourism offerings. This underscores the importance of prioritizing customer-centric approaches to improve perceived value and satisfaction, ultimately fostering sustainable growth in the tourism sector.

5.4. Limitations

This study faces several limitations that warrant consideration for future studies. Firstly, the reliance on Macao as a case study limits the generalizability of the findings, particularly regarding the convergence of the tourism industry in emerging tourist destinations. While Macao provides valuable insights into convergence dynamics in well-established tourist destinations, further study is needed to validate the innovation of tourism industry convergence in emerging destinations, which may exhibit different contextual factors and challenges. Secondly, this study does not delve into the convergence within specific industries, such as the sports and tourism sectors, which could offer unique insights into the convergence effects within distinct industry domains. Future studies could employ a more focused approach to analyze the convergence between two or more industries, thereby elucidating the nuanced effects and implications of industry convergence on various sectors. Lastly, the questionnaire survey of tourists presents a limited perspective on the convergence phenomenon within the tourism industry. While tourist perceptions are valuable, future studies could complement this perspective by exploring the residents' viewpoints in tourist destinations. Gaining insight into residents' perspectives on the significance, impact, and approach of industrial convergence would provide a more complete understanding of the dynamics of convergence from the multiple stakeholders' viewpoints. Incorporating diverse stakeholder perspectives would enrich the analysis and offer valuable insights for policymakers, industry practitioners, and other stakeholders shaping the tourism industry's convergence trajectory.

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