Additional Information

Identifying the factors determining the entrepreneurial ecosystem of internet cultural industries in emerging economies

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Abstract
The integration of the Internet and the real economy has propelled the formation of a new economy. Internet cultural industries—defined as a collection of industries that engage in creative cultural content, production, circulation, and services based on Internet technology and core digitization—are a critical part of this new economy. This study argues that the development of Internet cultural industries has created a new entrepreneurial ecosystem, which is a dynamic and open ecosystem impacted by numerous factors. Using a structural equation model (SEM) method, we empirically examine the factors impacting the entrepreneurial ecosystem of Internet cultural indus- tries. We find that both external ecosystem factors, including politics, the economy, sociocultural activities, and technological environments, and internal ecosystem factors, including netizens, governments, enterprises, and media and industry associations, are verified to significantly affect the entrepreneurial ecosystem performance of Internet culture industries. Most interestingly, we find that the political environment is the most crucial factor impacting the entrepreneurial ecosystem performance of Internet cultural industries. Thus, Internet cultural industries should prioritize the improvement of good government governance. Overall, our study deepens the research on the Internet entrepreneurial ecosystem by identifying its internal and external determining factors in the context of emerging economies.
Keywords Entrepreneurial ecosystem . Internet cultural industries . Netizens . Emerging economies . Government governance

Introduction

In the era of BInternet Plus, the Internet is no longer a synonym for the technology, but has been fully incorporated into the innovation processes of various industries, particularly the Internet cultural industries (ICIs), defined as a collection of industries that engage in creative cultural content, production, circulation, and services based on Internet technology and core digitization. It is well established that entrepreneurship is a vital element for economic growth, and the rise of ICIs has created a new entrepreneurial ecosystem (Audretsch et al. 2007; Beliaeva et al. 2017; Loganathan et al. 2017; Maroufkhani et al. 2018; Maroufkhani et al. 2018). Meanwhile, recipro- cally, a good entrepreneurial ecosystem can attract more Internet cultural enterprises to

join. Generally, ICIs can be divided into two major types. The first is Btraditional

cultural industries + Internet (e.g., traditional journalism, radio, television, literature, and art). These industries can create new development spaces and new entrepreneurial ecosystems by using the technology and platform of the Internet. The second major

type is BInternet + cultural industries, referring to new cultural industries that are based

on Internet technology (e.g., Internet audio-visual programs, Internet games, Internet social networking, and Internet information services).

ICIs' entrepreneurial ecosystem has some unique characteristics, including diversity, networking, symbiosis, and openness. According to statistical data (China Internet Network Information Center 2018), by June 2018, the number of Chinese netizens had reached 802 million, thus ranking first in number of netizens. Additionally, the data shows that the Internet penetration rate in China had reached 57.7%, more than the global average of 52%. Among them, there were 788 million mobile Internet users in China, accounting for 98.3% of the nation's netizens. Moreover, there were 663 million Internet news users, 609 million Internet video users, 555 million Internet music users, 425 million Internet live broadcast users, 569 million Internet payment users, 486 million Internet game users, 406 million Internet literature users, and 756 million instant

communication users (China Internet Network Information Center 2018). Al- together, these online users create an infinite space for the growth of ICIs and together form a high-quality entrepreneurial ecosystem (Acs et al. 2017).

From an ecology perspective, the healthy development of ICIs is premised on an open, stable, and controllable Internet entrepreneurial ecosystem. As Bosma et al. (2012) show, the intensity of entrepreneurial activity is related to the conditions of the environment. Moreover, entrepreneurial resources play a significant role in the development and survival of new business ventures (Pejic Bach et al. 2018; Xie and Lv 2018; Olugbola 2017). In this ecosystem, producers, operators, and consumers of Internet cultural products conduct the input and output activities of Internet informa- tion. Furthermore, these participants adapt to, coordinate with, and compensate for each

other in order to achieve a good balance of the entrepreneurial ecosystem of ICIs. Yet, in the BInternet Plus processes of cultural industries, there have been a series of

problems. First and foremost, traditional culture industries do not always fit into the era of BInternet Plus. For example, many newspapers and magazines are struggling to

survive (Makaruddin 2018), traditional publishing industries are dealing with a survival crisis, and the music industry is having a difficult time making profits (Lin 2018).

Second, some traditional culture industries are firmly boycotting what is taking place in the era of BInternet Plus. For example, some traditional radio and television

enterprises, publishing firms, and film and television companies have called for a boycott of Internet video platforms and Internet new media. Third, in the BInternet

Plus era, the traditional management system has failed to cope with a large number of issues, such as Internet copyright protections, pornographic and violent Internet con- tent, virtual relationships, and Internet security (Lopez-Fernandez et al. 2018; Weinberg 2018; Pardo-del-Val et al. 2012). As Acs et al. (2017) stress, the economics of the Internet has generally ignored the role of entrepreneurship in economic systems. Yet, the entrepreneurial ecosystem approach

has the promise to correct this shortcoming. Therefore, the entrepreneurial ecosystem of ICIs should be urgently improved upon in
the current BInternet Plus era.

From a theoretical perspective, several studies examine the factors impacting the entrepreneurial ecosystem of ICIs. First, some research focuses on the developmental strategies of ICIs (e.g., Cho et al. 2018; Gandia 2013; Hotho and Champion 2011; Zhang 2017); cultural innovations and operations (e.g., Chandna and Salimath 2018; Kim 2014); and the digital entrepreneurial ecosystem, consisting of the four concepts of digital infrastructure governance, digital user citizenship, digital entrepreneurship, and the digital marketplace (Sussan and Acs 2017). Second, some research centers on investigating the dilemma of the development of ICIs, such as negative or fake online information (e.g., Li 2017); insufficient government regulation (e.g., Wang 2014); software piracy (e.g., Goode and Kartas 2012); and new challenges to culture, art, and copyright brought on by artificial intelligence (AI) technology (e.g., Takushi 2017). Third, some researchers examine Internet cultural policies and entrepreneurial cultural activities (Shattock 2010; Etzkowitz 2016; Wang 2017). For example, Tsatsou (2010) suggests that Internet policies and regulations can help solve the problem of digital division. Furthermore, in this category of research, some investigators highlight the political features of instrumentalized Internet audio-visual policies (e.g., Jia and Winseck 2018; Newsinger 2012). Fourth, some researchers concentrate on the entre- preneurial barriers to ICIs (e.g., Welsh et al. 2014). For example, Welsh et al. (2014) indicate that art entrepreneurs face a variety of challenges in various psychological (e.g., peer support) and technical aspects (e.g., start-up skills).

Thus, in summary, most previous studies primarily analyze the strategies, policies, technology, and dilemmas of ICIs, but little research discusses the context of the entrepre-
neurial ecology of ICIs in the BInternet Plus era. Based on this research gap, the current
study explores the factors impacting the entrepreneurial ecosystems of ICIs, thereby con- tributing critical knowledge to our understanding of the entrepreneurial ecosystem of ICIs.

Theoretical framework

An ecosystem is a biotic community that encompasses its physical environment (Acs et al. 2017). From an ecological perspective, the entrepreneurial ecosystem of ICIs is a dynamic, diversified, and open ecosystem similar to the dissipative structure of a biological ecosystem. A growing amount of literature suggests that the entrepreneurial ecosystem has many components: entrepreneurial enterprises, governments, universi- ties, research institutions, financial institutions, and natural and social environments (Akbar et al. 2017; Auerswald 2014; Contín-Pilart and Larraza-Kintana 2015; Spilling 1996). In this work, we assume that the entrepreneurial ecosystem of ICIs is a

combination of both external and internal ecosystem factors. The objective of this ecosystem is to operate in an efficient, sustainable, and healthy manner. The external and internal factors of this ecosystem, along with corresponding hypotheses, are discussed in detail in the following sections.

External ecosystem factors

As noted above, the entrepreneurial ecosystem of ICIs is an integrated concept. Different creative members of the Internet culture are aggregated and, jointly, flourish in order to establish a complex and polymorphic community. According to previous studies (e.g., Collins and Snowball 2015; Le et al. 2013; Shorthose and Strange 2004; Tanner et al. 2017; Vogel 2013), non-biological elements, like political, economic, sociocultural, and technological environments, are seen as the external ecosystem factors impacting the entrepreneurial ecosystem of ICIs.

First and foremost, the economic environment is key for the steady development of the entrepreneurial ecosystem of ICIs. The rise of Internet society refers not only to the changing game rules but also the acceleration of innovations and applications of our information society (Castells 2001; Weinberg 2018). Therefore, there is a close rela- tionship between the internalized economic environment and the system's ecology (Shorthose and Strange 2004).

Second, a stable political environment is also critical for the development of the entrepreneurial ecosystem of ICIs. Here, some

studies stress the impact of firms' political connections on their investment and innovation decisions (Ahluwalia et al. 2017; Jimenez et al. 2017; Kim 2017; Yusoff et al. 2015). For example, if there is no supportive policy environment, entrepreneurship will be difficult due to the information asymmetry between banks and new ventures (Xu et al. 2018). Furthermore, recent research suggests that the development of ICIs is affected by the political environment (Tanner et al. 2017). For example, Internet video is increasingly characterized by political instrumentalized elements (Newsinger 2012). Here, Leiva (2011) stresses the significance of interactions between cultural policy and innovation in the information age by examining European cultural policies. In some ways, the national macro-strategic environment is, to a great extent, capable of determining the development of entrepreneurial ecosystems of different industrial sectors (Cooke and De Propris 2011; Isenberg 2010).

Third, in terms of the technological environment, the Internet's entrepreneurial ecosystem, which is characterized by digitalization and informatization, is seen as a type of technology ecosystem due to the fusion of new technology and entre- preneurial Internet culture. In the era of the technological transformation of the Internet, big data, intelligent manufacturing, and digital technology, the environ- ment constantly reshapes the creation of ICIs (Le et al. 2013; Höflinger et al. 2018). Further, the technology environment propels business integration, as well as the innovation of new products (Gandia 2013). For example, differences in content between print media and online media have been significantly affected by the Internet technology environment (Cacciatore 2012; Pitchayadol et al. 2018). There are other examples as well, including the application of AI in Internet games and the creative design field (Downey and Charles 2015; Williams and McOwan 2016).

Finally, sociocultural environments have great impacts on the development of the entrepreneurial ecosystem of ICIs. An open and tolerant innovation environment and entrepreneurial culture are particularly important (Cohen 2006; Pejic Bach et al. 2018; Stuetzer et al. 2014). Collins and Snowball (2015) argue that society's recognition of cultural innovation and the balance of the Internet's social ecosystem will both signif- icantly impact the development of the entrepreneurial ecosystem of ICIs. Moreover, the size and

behaviors of the new ventures are often influenced by social referents (Capelleras et al. 2016; Martin-Sanchez et al. 2018).

In fact, the negative external effect of the ICI ecosystem is not affected by just one entrepreneurial environmental factor, but rather, by numerous factors (e.g., enterprises, the institutional framework, and creators, as well as the cultural environments in which they are located) (Grandadam et al. 2013; Ho et al. 2018). Thus, the entrepreneurial ecosystem of ICIs is a complex, uncertain, and interdependent game relation among various external environmental factors. Based on this discussion, we propose the following theoretical hypothesis:

Hypothesis 1 (H1): External ecosystem factors are positively correlated to the entrepreneurial ecosystem performance of ICIs (H1a: political environments; H1b: economic environments; H1c: sociocultural environments; H1d: technological environments).

Internal ecosystem factors

From an ecological perspective, the entrepreneurial ecosystem of ICIs is diversified, consisting of many constituents playing various roles, including producers, trans- mitters, consumers, and regulators. A healthy entrepreneurial ecosystem of ICIs is often characterized by a stable and sustainable operation (Zorio et al. 2013). In addition, the ICIs employ different types of technology and content to create cultural products for Internet users via the online market, thus promoting the development of ICIs.

Accordingly, within the entrepreneurial ecosystem of ICIs, there is an industrial ecological chain of netizens, Internet cultural enterprises, governments, and media and industry associations, which play essential roles within the ecosystem. Researchers in this field devote much of their attention to the key concept of the BFandom public when discussing theories associated with the public, the social networks, and the actor networks (Lin and Zhang 2018).

First, netizens, serving as both consumers and producers facilitating the transforma- tion and innovation of Internet cultural content, are

the most fundamental component of the entrepreneurial ecosystem of ICIs (Allen and Turner 2017). Additionally, within the Internet field, netizens are also the entrepreneurs who need a good environment in which they can innovate and prosper in their respective businesses (Maroufkhani et al. 2018). Netizens, as consumers and entrepreneurs, participate in Internet cultural crea- tion to improve the innovations of ICIs (Ge and Gretzel 2018; Parmentier and Mangematin 2014). Simultaneously, netizens' rights and interests are extended in the Internet era, enabling them to be a unique force that affects public affairs (Bakardjieva 2012). Moreover, in the era of consumer-created content (Hartley 2017), netizens are one of the most critical forces propelling the development of the entrepreneurial ecosystem of ICIs.

Second, within the entire ecosystem, Internet cultural enterprises that obtain the relevant ideas, resources, and solutions from the external environment are the primary group that improves the capability of ICIs (Lee et al. 2015; Ricciardi et al. 2018). The social networks of entrepreneurs are an important factor affecting new venture perfor- mance (Xie and Lv 2016). ICIs, which gather elements to propel innovation, can significantly promote innovation overflow, thus they are beneficial for increasing the industry's innovation efficiency and accelerating the formation of the entrepreneurial ecosystem. Moreover, ICIs' creative workers are the vital input in innovation processes (Brandellero and Kloosterman 2010). However, some literature also highlights the fact that ICIs have several problems, such as the homogenization of creative content and a lack of creativity among employees (Kamprath and Mietzner 2015).

Third, as the policymaker for the development of the entrepreneurial ecosystem of ICIs, the government is particularly important for designing appropriate and timely cultural policies, which may deeply affect the creation paradigm of innovation and content production (Pitchayadol et al. 2018; Stylianou-Lambert et al. 2014; Tsatsou 2010). For example, Budyldina (2018) indicates that numerous political initiatives have emphasized government support for entrepreneurial activities at regional universities. Moreover, it is well known that intellectual property rights (IPRs) are of strategic significance in creative industries (Ang et al. 2014). However, in contrast, some studies show that policies that promote industrial

innovation actually reduce the average level of innovation (Bae and Yoo 2015), suggesting the appropriateness of government enacted policies.

In addition, media and industry associations are increasingly important in the development of the entrepreneurial ecosystem of ICIs (Richey and Ravishankar 2017). As Schmitz et al. (2017) argue, links to an industrial association are considered crucial for many enterprises. Therefore, it is also vital to exercise the media's role as a supervisor of the ecosystem, which is especially true in the context of digitalization (Edwards et al. 2015).

In sum, the interactions and connections of the different members within the entrepreneurial ecosystem of ICIs, including Internet culture enterprises, netizens, governments, and media and industry associations, have shaped a self-reinforcing ecosystem characterized by mutually beneficial relations. Therefore, we propose the following theoretical hypothesis:

Hypothesis 2 (H2): Internal ecosystem factors are positively correlated to the entrepreneurial ecosystem performance of ICIs (H2a: Internet culture enterprises; H2b: government; H2c: netizens; H2d: media and industry associations).

The research framework of this study is shown in Fig. 1. As mentioned earlier, in the entrepreneurial ecosystems of ICIs, factors impacting the performance of the entrepre- neurial ecosystem include both external ecosystem factors and internal ecosystem factors. The external ecosystem factors consist of the political, economic, sociocultural and technological environments. Among them, the technological environment— especially content technology (CT)—is critical (Kim 2009). For instance, as an art form, Internet art is directly associated with a world shaped by Internet technology (Christou 2018). The internal ecosystem factors include the government, the Internet cultural enterprises, netizens, and media and industry associations. As robust drivers of product innovation, these creative members are able to upgrade the knowledge and creative content of cultural products and services (Brandellero and Kloosterman 2010; Lee and Drever 2013). Altogether, both sets of factors significantly affect the entrepre- neurial ecosystem performance of ICIs.

Methods
Data source and sample

The data was collected using a survey method. We sent questionnaires to Chinese Internet cultural enterprises, netizens, relevant administrative departments, and in- dustry associations in the cities of Beijing, Shanghai, Guangzhou, Shenzhen, and Hangzhou in China. We applied a random stratified sampling method, which was combined with an e-mail survey, a postal survey, and a field survey. Out of 800 questionnaires, 478 usable questionnaires were returned, providing an effective response rate of 59.75%.

The sample covered highly representative demographic characteristics on six di- mensions: gender, age, education, marriage, income, and industry. In the category of gender, 46.2% respondents of the total sample were male, and 53.8% were female. Regarding the ages of the respondents, 71.7% respondents of the total sample were younger than 35. In terms of educational background, 55.5% respondents of the total sample had bachelor's degrees or more advanced degrees (i.e., master's and doctoral degrees). Regarding marital status, 51.8% respondents of the total sample were unmar- ried, and 48.2% were married. In terms of income, 77.9% respondents of the total sample stated that their annual income was less than 100,000 yuan per year. Lastly, as it pertained to types of industry, 41.0% respondents of the total sample worked in the education and research sectors. From these statistics, we found that the distribution of the sample was well represented.

Measures

Dependent variable

According to previous research (Auerswald 2014; Gandia 2013; Grandadam et al. 2013; Kim 2014; Lopez-Fernandez et al. 2018), and based on the development status and characteristics of China's network culture industries, the entrepreneurial ecosystem performance of ICIs was measured using six items (see Table 1).

Each item was scored on a 5-point Likert scale: 1 = 'very low' to 5 = 'very high'.

Independent variables

Also based on the development status and characteristics of China's network culture industries, we conceptualized the internal ecosystem factors as a four-dimensional construct: (a) netizens, (b) Internet cultural enterprises, (c) government, and (d) media and industry associations. Each dimension of the construct was measured using several items. According to previous research (Ge and Gretzel 2018; Parmentier and Mangematin 2014), based on the characteristics of Chinese netizens, the dimension of netizens were measured using two items. Following the work of Kamprath and Mietzner (2015) and Lee et al. (2015), based on the development status and character- istics of China's Internet cultural enterprises, the dimension of Internet cultural enter- prises were measured using two items. Also, according to previous research (Ang et al. 2014; Isenberg 2010; Leiva 2011; Stylianou-Lambert et al. 2014), the dimension of government was measured using two items. Lastly, following Edwards et al. (2015), Hinck (2018) and Richey and Ravishankar (2017), the dimension of media and industry associations were measured using three items.

Similarly, based on the development status and characteristics of China's network culture industries, we conceptualized the external ecosystem factors as a four- dimensional construct: (a) political environments, (b) economic environments, (c) sociocultural environments, and (d) technological environments. According to previous research (Kim 2017; Vogel 2013; Yusoff et al. 2015), political environments were measured using the level of national strategic support. Following the work of other researchers (Castells 2001; Mason and Brown 2014; Shorthose and Strange 2004), economic environments were measured using two items. Also according to previous research (Cohen 2006; Collins and Snowball 2015), sociocultural environments were measured using the level of socio-cultural ecology. In addition, following previous research (Downey and Charles 2015; Graña et al. 2018; Kim 2009; Le et al. 2013), technological environments were measured using three items. The measures of each are summarized in Table 1.

Reliability and validity testing

Reliability analysis can be employed to examine the internal consistency of each construct. It is generally tested using the Cronbach's alpha coefficient. If the Cronbach's alpha value of each measured variable is higher than 0.70, suggesting a relatively high reliability level. The results in Table 2 show that the alpha values of each subscale of the questionnaire were, overall, higher than 0.7, and that the total internal consistency coefficient of the questionnaire was 0.893. These results suggested that the research scale had good internal consistency.

Apart from the reliability analysis, the data was adopted to conduct an exploratory factor analysis of the internal structure validity of the ICIs' entrepreneurial ecosystem model (Browne and Cudeck 1993). The results in Table 3 showed that the Kaiser- Meyer-Olkin (KMO) value was 0.901, thus higher than 0.7 and that the p value of the Bartlett's test was below 0.001, suggesting that the scale had good construction validity, thus laying the foundation for our factor analysis.

Table 1 Constructs and measures

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Latent variables		Observation variables	Literature sources
Entrepreneurial ecosystem performance		EEP 1. Entrepreneurial model diversity	Auerswald 2014; Gandia 2013; Grandadam et al. 2012; Lopez-Fernandez et al. 2018
		EEP 2. Netizens' satisfaction	
		EEP 3. Industrial innovation performance	
		EEP 4. Industrial product diversity	
		EEP 5. Industrial operation performance	
		EEP 6. Netizens' participation enthusiasm	
Internal ecosystem factors	Netizens	IEF 1. Proportion of cultural consumption expenditure	Ge and Gretzel 2018; Parmentier and Mangematin 2014
		IEF 2. Proportion of Internet cultural consumption expenditure	
	Internet cultural enterprises	IEF 3. Proportion of Internet cultural enterprises	Lee et al. 2015; Kamprath and Mietzner 2015
		IEF 4. Level of enterprise innovativeness	
	Government	IEF 5. Effectiveness of government functions	Ang et al. 2014; Leiva 2011; Isenberg 2010; Stylianou-Lambert and Christodoulou-Yerali 2014
		IEF 6. Effectiveness of government supervision	
		IEF 7. Effectiveness of institutional innovation	
	Media and industry associations	IEF 8. Effectiveness of industry associations	Edwards et al. 2015; Hinck 2018; Richey and Ravishankar 2017
		IEF 9. Effectiveness of nongovernmental organizations	
		IEF 10. Effectiveness of media	
External ecosystem factors	Political environments	EEF 1. Level of national strategic support	Kim 2017; Yusoff et al. 2015; Vogel 2013
	Economic environments	EEF 2. Level of macroeconomic environments	Castells 2001; Mason and Brown 2014
		EEF 3. Level of microeconomic environments	
	Sociocultural environments	EEF 4. Level of sociocultural ecology	Collins and Snowball 2015; Cohen 2006
	Technological environments	EEF 5. Level of Internet equipment	Downey and Charles 2015; Graña et al. 2018; Kim 2009; Le et al. 2013
		EEF 6. Level of Internet technology	
		EEF 7. Proportion of netizens who master Internet technology	

Following the reliability and validity analyses, the principal component analysis method was employed to extract six common factors, with a cumulative equation interpretation rate 60.43%. The six common factors converged after six iterations and formed the factor loading matrix (as listed in Table 4) through the orthogonal rotation of Kaiser standardiza- tion. The nine originally designed dimensions with their 23 items were reclustered into six common factors by clustering the results of all items. Moreover, the common factors were renamed using the following nomenclature: (1) entrepreneurial ecosystem performance; (2) political, economic, and sociocultural environments; (3) enterprise, media, and industry associations; (4) technological environments; (5) government; and

(6) netizens. According- ly, the internal structure of both the external ecosystem factors and the internal ecosystem factors of the entrepreneurial ecosystem was further clarified.

Table 2 Reliability test

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Latent variable	Number of items	Cronbach's alpha	Reliability level
Entrepreneurial ecosystem performance	6	0.786	High
External ecosystem factors	7	0.798	High
Internal ecosystem factors	10	0.787	High
Total	23	0.893	High

Results

The exploratory factor analysis results suggest that in terms of the external ecosystem factors, the political, economic, and sociocultural environments are closely associated with each other, and that the technological environments become a relatively independent force. In terms of the internal ecosystem factors, the enterprise, media, and industry associations gather together, and the government (regulator) and netizens (consumers) become relatively independent forces. Following these results, the path diagram of the SEM is shown in Fig. 2.

Model test results

The model's fit indices are shown in Table 5. According to Browne and Cudeck (1993), a mean square error approximation (RMSEA) value that is less than or equal to 0.08 indicates an acceptable fit. The results in Table 5 show that the RMSEA is 0.056, which is lower than 0.08. Further, the chi-square value/degree of freedom is 2.474, which is lower than 3.0. Moreover, both the comparative fit index (CFI) and the adjusted goodness-of-fit index (IFI) are slightly higher than the threshold value of 0.90. Overall, the fit indices suggest that the model fit the data fairly well.

Table 3 KMO and Bartlett's Test

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Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.901
Bartlett's Test of Sphericity	Approx. Chi-Square	3725.093
	df	253
	Sig.	0.000

Table 4 Factor loading results

Items	Entrepreneurial ecosystem performance	Political, economic and sociocultural environments	Enterprise, media and industry associations	Technological environments	Government	Netizens
EEP 5.	*0.678*	0.107	0.073	0.083	0.184	0.186
EEP 4.	*0.675*	0.053	0.079	0.163	0.277	−0.031
EEP 3.	*0.641*	0.158	0.089	0.092	0.052	−0.044
EEP 1.	*0.637*	0.220	0.190	0.060	0.211	0.125
EEP 2.	*0.562*	0.269	0.221	0.285	−0.010	0.137
EEP 6.	*0.489*	0.109	0.283	0.081	0.114	0.062
EEF 2.	0.100	*0.799*	0.114	0.068	0.039	−0.038
EEF 1.	0.176	*0.751*	0.179	0.116	0.067	−0.011
EEF 3.	0.197	*0.723*	0.036	0.126	0.199	−0.005
EEF 4.	0.165	*0.678*	0.169	0.162	0.129	0.110
IEF 9.	0.129	0.040	*0.727*	0.105	0.054	−0.063
IEF 8.	0.074	0.123	*0.703*	0.142	0.274	0.107
IEF 10-.	0.157	0.217	*0.672*	0.089	0.149	0.122
IEF 4.	0.418	0.099	*0.525*	0.118	0.195	0.068
IEF 3.	0.388	0.325	*0.520*	0.156	−0.106	0.087
EEF 5.	0.057	0.223	0.131	*0.794*	0.007	0.092
EEF 6.	0.316	0.173	0.094	*0.740*	0.052	0.035
EEF 7.	0.161	0.054	0.203	*0.737*	0.241	0.053
IEF 6.	0.196	0.088	0.263	0.023	*0.766*	0.069
IEF 5.	0.165	0.239	0.105	0.191	*0.687*	0.061
IEF 7.	0.450	0.093	0.124	0.068	*0.627*	0.084
IEF 1.	0.263	0.060	0.000	−0.024	0.010	*0.829*
IEF 2.	−0.032	−0.039	0.150	0.183	0.145	*0.797*

Major findings

The path coefficients and the hypotheses' verification results are given in Table 6 and Fig. 3. The results show that the political, economic, and sociocultural environments (b = 0.160, p < 0.001), as well as the technological environment (b = 0.153, p < 0.05), are all positively correlated with the entrepreneurial ecosystem performance of ICIs.

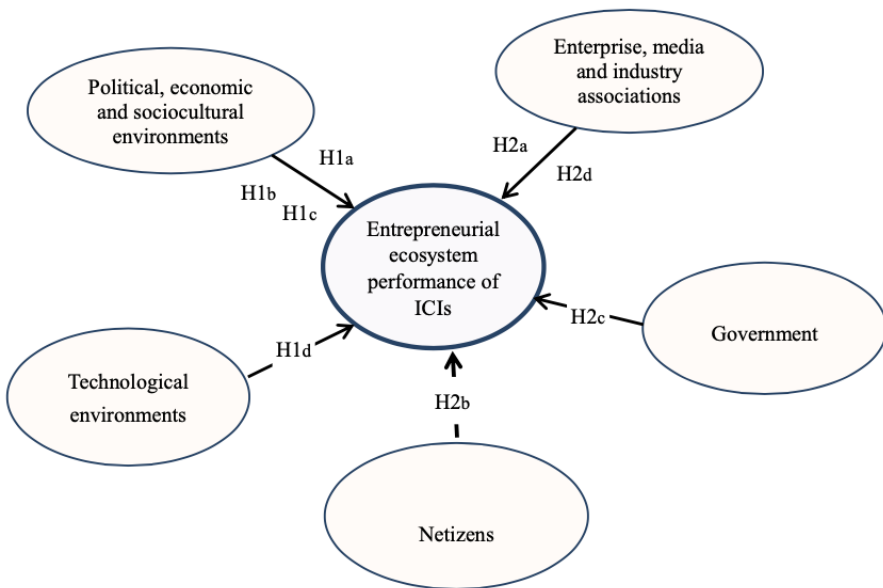Fig. 2 Conceptual model

Therefore, H1a, H1b, H1c, and H1d are all supported. Moreover, the results also demonstrate that the netizens (b = 0.114, p < 0.05), government (b = 0.373, p < 0.001), and enterprise, media, and industry associations (b = 0.273, p < 0.05) are all positively correlated with the entrepreneurial ecosystem performance of ICIs. Therefore, H2a, H2b, H2c, and H2d are all supported, as well.
In brief, technological environments are usually seen as the most critical factor affecting the entrepreneurial ecosystem performance

of ICIs. Yet, our findings reveal that technological environments have less impact on the entrepreneurial ecosystem performance of ICIs compared to other factors. We argue that this finding is consistent with the rapid development of China's ICIs. Thus, the key factors determining the development of the entrepreneurial ecosystem of ICIs are the effectiveness of the governing institutions, as well as the sound development of enterprise, media, and industry associations. Moreover, the relationship between ICIs' internal and external ecosystem factors is shown in Table 7. The results suggest that in the ecological chain of the ICIs, the association between the active members (i.e., governments, enterprises, netizens, and media and industry associations) and external ecosystem environments (i.e., political, economic, sociocultural, and technological environments) is statistically significant. The results also demonstrate that the relationships among the external ecosystem factors are significant ($p < 0.001$), suggesting that the political, economic, sociocultural, and technological environments interact with each other. Furthermore, the findings show that the relationships among the internal ecosystem factors (i.e., the Internet cultural enterprises, netizens, government, and media and industry associations) are also significant ($p < 0.001$). Overall, these results suggest that the revised model fully reflects the correlation between the external and internal variables.

Table 5 The model's fit indices

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| Fit indices	Chi-square value / degree of freedom	Root mean square error approximation	Comparative fit index	Adjusted goodness-of-fit index
Fit indices symbols	x^2/df	RMSEA	CFI	IFI
Fit value	2.474	0.056	0.910	0.911
Evaluation standard	<3.0	<0.08	>0.90	>0.90
Fit evaluation	Yes	Yes	Yes	Yes

Table 6 Path coefficients and hypotheses verification results

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Parameter path	Standardized coefficient	Standard error	Critical ratio	Significance	Model hypotheses	Results
Entrepreneurial ecosystem performance ← Political, economic and sociocultural environments	0.160	0.045	2.633	***	H1a, H1b H1c	Supported
Entrepreneurial ecosystem performance ← Technological environments	0.153	0.039	2.457	0.014	H1d	Supported
Entrepreneurial ecosystem performance ← Enterprise, media and industry associations	0.273	0.102	3.177	0.001	H2a, H2d	Supported
Entrepreneurial ecosystem performance ← Netizens	0.114	0.044	2.051	0.040	H2b	Supported
Entrepreneurial ecosystem performance ← Government	0.373	0.056	4.742	***	H2c	Supported

Note:*** Significant at 0.001 level

Fig. 3 Results of SEM
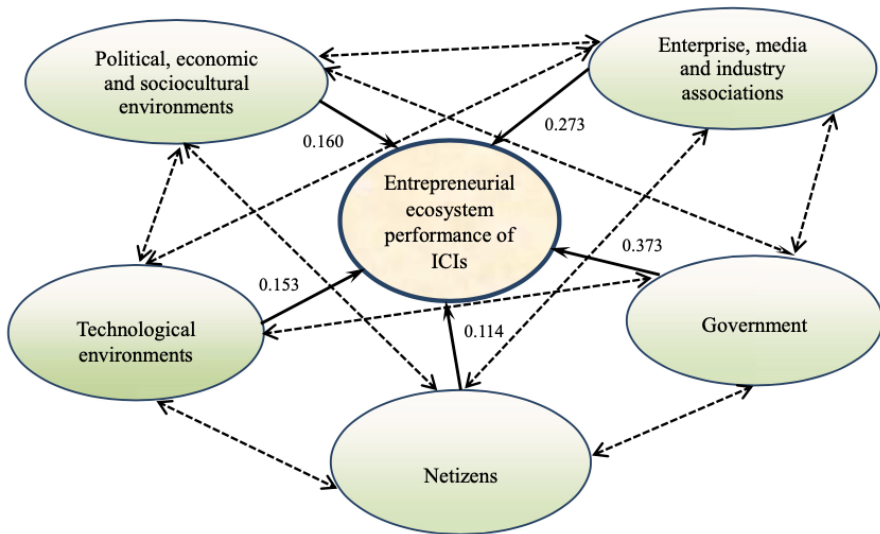
Discussion and contributions

This study comprehensively identifies the internal and external factors impacting the entrepreneurial ecosystem of ICIs. The internal ecosystem factors consist of the netizens, governments, Internet cultural enterprises, and media and industry associations, while the external ecosystem factors comprise the political, economic, sociocultural, and technological environments. Together, these components allow us to propose a new conceptual framework describing the entrepreneurship ecosystem (Vogel 2013). The results show that the impact of government on the entrepreneurial ecosystem of ICIs is higher than that of enterprises, media and industry associations. This fact reveals that it is the government— rather than the netizens—that is the real dominator of the current entrepreneurial ecosystem of ICIs. This is a particularly thought-provoking finding. In particular, China currently has the world's largest population of netizens, and one might think this fact would have been the strongest driving force to improve the entrepreneurial ecosystem of ICIs. However, the results show that the role of Chinese netizens is actually rather weak. There are several possible reasons for this finding. First, netizens are active on the Internet in the whole industrial chain, whereas they primarily partic- ipate in it in order to receive free services and products. Second, netizens neither participate in the production of the Internet cultural enterprises nor do they supervise and govern Internet culture. Thus, the impact of netizens on the development of the entrepreneurial ecosystem of China's ICIs is smaller than might be expected.

Second, the political, economic, and sociocultural environments have had a rela- tively strong impact on the development of the entrepreneurial ecosystem of China's ICIs compared with the technological environment. This suggests that the major obstacle to the development of the entrepreneurial ecosystem of ICIs in China is not found in the technology environment. Thus, to improve entrepreneurial ecosystem, we should combine Internet entrepreneurial orientation and cultural policy.

Overall, our findings extend prior research by comprehensively examining the relationships between the different ecosystem factors and the entrepreneurial ecosystem performance of ICIs.

Moreover, this study examines the impact of governmental governance on the entrepreneurial ecosystem of ICIs, which extends the work of prior research in this area (e.g., Collins and Snowball 2015; Cooke and De Propris 2011; Keane and Chen 2017; Isenberg 2010).

Managerial implications

In conclusion, we find that China's current ICIs continue to be dominated by the government. However, driven by the BInternet Plus strategy, some problems, along
with particular traditional ecological patterns (e.g., insufficient information flow and resource monopolies), can be addressed by the new Internet system. The BInternet
Plus strategy is a fundamental and vital way to upgrade the entrepreneurial ecosystem of ICIs. Accordingly, there are managerial implications that can be drawn from our study.
First, in the era of BInternet Plus, as the dominant force in China's ICIs, the
government should be involved in the development of the industry by changing the traditional linear organizational structure, building a cross-departmental, flat, integrat- ed, and connected management system for ICIs while also improving the efficiency of its government management. Cross-cultural management in the online environment is a
new research direction in the field (Lichy and Stokes 2018). Additionally, the BInternet
Plus strategy is consistent with the integration of cultural industries and AI technology. Given that AI technology can provide the technical support for efficient, scientific decision-making (Irfan et al. 2017), the government should fully exploit new technologies like AI to promote the development of the entrepreneurial ecosystem of ICIs.
Second, efforts should be made to guide Internet cultural enterprises, netizens, and media and industry organizations to actively participate in the development of ICIs. Start-ups in the Internet entrepreneurship ecosystem should entail both an
Bentrepreneurship mindset aspect and a Bventure creation aspect (Welsh et al.

2014), which, together, can form the creation of distinctive learning competencies (Aljuwaiber 2016; Honig and Hopp 2019). Particularly, Internet cultural enterprises should improve their capacities for technological innovation, content creation, and managerial innovation throughout their entire operations. Additionally, Internet cultural enterprises should also continually seek innovations to develop and exploit unique information systems to create competitive advantages over their competitors (Anand and Walsh 2016; Palacios-Marqués et al. 2017). Moreover, the leading Internet cultural enterprises should abide by corporate social responsibility guidelines and produce more high-quality cultural products in order to elevate the taste of consumers and improve all operational and entrepreneurial environments (Galant and Cadez 2017).

Third, netizens are the most active factor in the chain of ICIs. Given that the process of consumption for netizens is the process of transmission of Internet culture product, efforts should be made to enhance the dual roles of netizens as both the producers and governors of ICIs by strengthening their self-discipline. Specifically, in the era of AI, the requirement for quality entrepreneurs has become even higher. The entrepreneurs who will be needed in the future are those who can use AI to reconfigure the lines of production, distribution, exchange, and consumption in order to change the way humans live and think. Moreover, media and industry associations should properly guide public opinion and serve as a bridge between industries and the government, so as to create an orderly Internet entrepreneurial environment.

Limitations and further research

This study provides a new theoretical framework to examine the relationship between entrepreneurial ecosystem performance and internal and external ecosystem factors. However, some limitations should be addressed, as they may influence future research directions. First, our empirical results are derived from a sample of Chinese netizens and cultural enterprises, which might be country-specific. Future research could use samples from other emerging countries to test and extend this research. Second, the data for this study are based on the perceptions and experiences of the

respondents, which can vary widely, depending on work experience of each respondent. Third, the relationship between entrepreneurial ecosystem performance and the ecosystem factors needs to be explored further by incorporating other factors, such as big data and AI (Irfan et al. 2017; Williams and McOwan 2016). It is our hope that by discussing these limitations, we are helping point the way forward for future research in this area.

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