



# Role of the e-exhibition industry in the green growth of businesses and recovery

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## Abstract

In this paper, a survey and two multi-attribute decision-making (MADM) models have been employed to explore critical success factors of e-exhibition in 30 Chinese provinces that is divided into 8 different regions. The research findings showed that in China, the most important success factors of e-exhibition to have green economic recovery are the presence of International collaboration (0.592), green culture (0.490), and visitor's attitude (0.439). Furthermore, "Beijing and Tianjin" is the most ideal region to promote e-exhibition in China. South Coast region ranked in second place as the most appropriate region for e-exhibition. The least ideal region of China for e-exhibition is the Southwest region that is less developed compared to other regions of China. The major practical policies are the enhancement of international cooperation to hold an e-exhibition, use of electronic exhibition capacities (synchronous and asynchronous) and creating social sustainability awareness through the media and social network.

**Keywords** Sustainable exhibition · Green economic growth · Chinese regions · Multi-Attribute Decision-Making (MADM)

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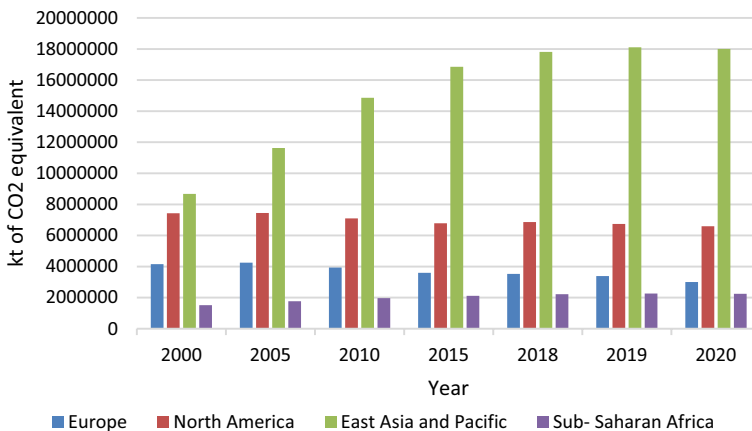
**JEL Classification** L83 · F43 · B22 · C54

## 1 Introduction

The climate change threat has been surged due to the rapid growth of industrialization and global population (Taghizadeh-Hesary et al. 2022; Phung et al. 2022; Zhao and Rasoulinezhad 2023). The threat of climate change is a potential danger to human life on the planet, and it currently causes events such as drought, air pollution, global warming, ozone layer depletion, and polar ice melting, which affects the quality of life and health of the people worldwide. Rasoulinezhad (2020), Yoshino et al. (2021) and Santos and Bakshoodeh (2021) express that climate change due to industrial and human activities has become a major challenge of international community. According to Abbass et al. (2022) and the Emissions Gap Report (2022) by the UN, climate change is not the problem of one country or region, but the problem of the world, and all the countries of the world should try to control this problem and solve it in the future with unity and commitment.

Despite various international protocols and agreements (e.g., The Paris Agreement, 2015; Agreement on the Protection and Sustainable Development of the Prespa Park Area, 2010; International Tropical Timber Agreement (ITTA), 1994; UN Framework Convention on Climate Change (UNFCCC), 1992), this problem still persists and the amount of greenhouse gas emissions such as carbon dioxide (as the main cause of climate change) has not been controlled globally, and there is no guarantee that it will decrease in the future. Figure 1 shows the total GHGs emissions in different regions over 2000–2020. It can be seen that the GHGs emissions have been raised over the two recent decades and the contributions of East Asia and Pacific have been larger than other regions.

The failure of these international agreements has various reasons. First, most of the countries attributed the reduction of production and industrial activities to



**Fig. 1** Greenhouse gas emission, 2000–2020, kt of CO<sub>2</sub> equivalent. Source: Authors based on BP

reduce the emission of carbon dioxide as the cause of economic stagnation and the shrinking of the size of their economy (following Zhang et al. (2017) and Nong and Siritwardana (2018), it is the main reason of the US withdrawal from the Paris agreement on 1 June 2017). Therefore, governments prevent the implementation of policies to protect the environment or try to implement staggered and slow policies. On the other hand, some countries interested in implementing policies to deal with environmental pollution do not have the necessary infrastructure for the effective implementation of these policies, and their implementation policies usually fail (e.g., Keenan et al. (2019) for the case of the state of Victoria, Australia; Li et al. (2019) for the case of Jiangsu province, China). Although this explanation does not mean the failure of all policies and many countries have been able to formulate and implement effective short-term and long-term solutions to deal with environmental threats (e.g., Arimura et al. 2019 for the case of Japan; Fekete et al. (2021) for the cases of India and the European Union).

The outbreak of the Corona virus caused a great shock to the world economy since the first news of it was published in early December 2019. In order to control the disease and reduce the number of people infected with this virus, governments were forced to apply corona restrictions (including urban quarantine, closing territorial borders, closing economic markets and shopping centers, etc.), this involvement of government authorities has proven to mitigate the impact of disease outbreaks (Shang et al. 2021). It became a city, the result of which was the reduction of fossil fuel consumption and the temporary reduction of carbon dioxide emissions (Shang et al. 2022b). Ray et al. (2022) measured the CO<sub>2</sub> reduction by the COVID-19 and found out that CO<sub>2</sub> reduced by 438 Mt in 2020 compared to 2019. Nicolini et al. (2022) mentioned that the reduction in carbon dioxide emissions under the conditions of Corona restrictions was temporary, and in 2021, an increase in carbon dioxide emissions to the pre-Corona level has been observed.

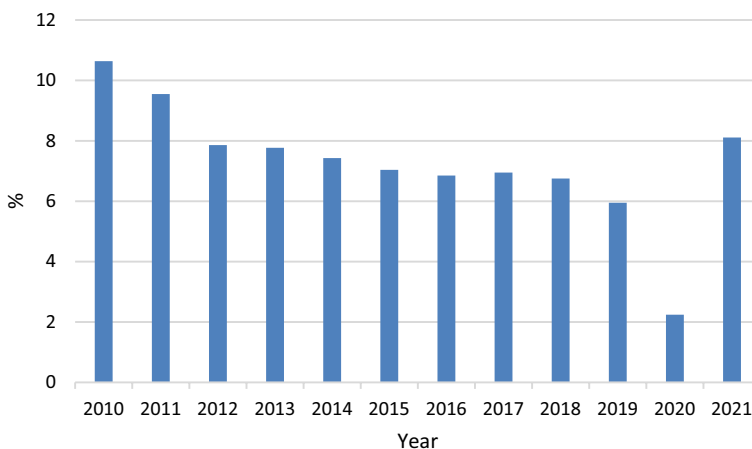
Many experts have considered this even temporary decrease as an important opportunity for the countries of the world to revive the green economy and pay more attention to the goals of sustainable development. According to many economists, the partial or complete stoppage of economic enterprises during the corona era and their restart in the post-corona era can facilitate the path of countries in reaching the goals of zero carbon economy. Tian et al. (2022) highlight this opportunity for China as a giant carbon emitter in the world and conclude that the country can run green economic recovery with a clear plan like China's Peak emissions in 2030 and carbon neutrality plan by 2060. It should be noted that the green revival of economic growth in the post-corona era is not easy and requires government support and the existence of prerequisites such as clear regulations, the existence of a green culture in society, and the absence of political and geopolitical tensions.

One of the new drivers with potential in advancing the goals of revitalizing green economic growth is holding electronic exhibitions. Such exhibitions are also planned in economic literature under the title of eco-exhibition or sustainable exhibition, which in general means holding any exhibition through an electronic and virtual platform. Kamariotou et al. (2021) express that virtual exhibitions have many advantages for the host country. It provides a larger revenue with an appropriate support of environmental protections. Ario et al. (2022) believe that virtual exhibition

can make a better experience for participators in terms of brand visibility, global reach and cost reduction. Considering the resumption of economic activities in the post-corona era and the need to hold various exhibitions for more interaction between manufacturers and traders, the policy of developing virtual exhibitions will be one of the important drivers of economic green revival of countries in the post-corona era.

China is the country that identified and announced the first case of corona disease in the city of Wuhan. The outbreak of this disease caused the economic engine of China to stagnate. According to the World Bank database, the economic growth of this country reached 2.24% in 2020 from about 5.95% in 2019. However, with the implementation of Corona control policies, China's economy returned to the production track in 2021 and the country's economic growth reached more than 8.1%. Figure 2 shows the trend of economic growth in China over the period of 2010–2021.

It is clear that China has implemented the revival of its economy in 2021 and the engine of economic activities of this country has been turned on again. According to Wang et al. (2023), China as the “World's factory” has tried to employ fiscal and monetary policies for economic recovery in the post-COVID era. The recovery of China's economic growth is good news for the world economy on the one hand, because China has a very high share of world production (over 18.18% and 18.56% of global GDP in 2020 and 2021, respectively) and energy consumption in the world (nearly 23.81% of global energy consumption in 2021), and therefore, the economic growth of this country means that other economies in the world will come out of recession. However, many experts are concerned about the aggravation of environmental pollution due to China's high economic growth in the post-corona era. In 2020, the country contributed for over 30% of the global GHGs, addressing the country as the largest emitter worldwide. Therefore, the issue of “green economic revival” through various drivers such as virtual exhibitions in China is necessary and important to study. The exhibition industry has become a major developing

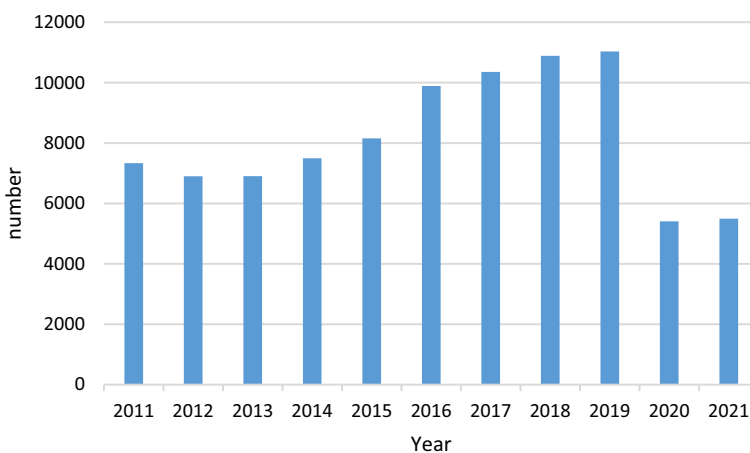


**Fig. 2** Economic growth of China, 2010–2021, %. Source: Authors from World Bank

economic sector of China in recent decades. From 2011 to 2019, the exhibition industry in China has experienced an increasing trend. As the number of trade fairs held in China has increased from 7333 in 2011 to 11,033 in 2019. With the spread of the Corona virus, the exhibition industry in China entered a recession and the number of exhibitions held in this country decreased to 5408 in 2020. However, the revival of China's economic growth in 2021 had a positive effect on the industry, and the number of exhibitions held in China increased by 5495 this year (Fig. 3).

In the last decade, China has carried out various e-exhibition (e.g., the 4th China International Import/Expo (CIIE) in 2021 as virtual trade fair) in different socio-economic aspects. According to the announcement of “30–60” decarbonization goal of China by President Xi in 22.09.2020 and the special focus of the 14th Five-Year Plan of China on environmental enhancements, the exhibition industry in China can go toward sustainability through virtual exhibition, increasing energy efficiency, and green building policies.

The paper seeks to make contributions to earlier studied through the following aspects: First, a survey and two multi-attribute decision-making (MADM) have been employed to explore critical success factors of e-exhibition in China. Second, the 30 Chinese provinces are divided into 8 different regions (i.e., Beijing and Tianjin, North, Northeast, Central Coast, Central, South Coast, Southwest and Northwest). This division of Chinese provinces has been used by previous studies such as (Mi et al. 2017; Zheng et al. 2019). The critical success factors of e-exhibition are evaluated in each Chinese regions based on the experts' opinions. It can be concluded that the study of electronic exhibition and its effect on the recovery of green economic growth in China is of great importance. Therefore, understanding the dimensions of electronic exhibitions as drivers of sustainable development in China should be given deeper attention. This issue has not been studied in terms of a regional survey in China. Therefore, this paper tries to fill these literature gaps and provide new and practical insights to the policymakers.



**Fig. 3** Trade exhibitions in China, 2011–2021, number. Source: Authors from China International Import Expo (CIIE)

The research findings showed that in China, the most important success factors of e-exhibition to have green economic recovery are the presence of International collaboration (0.592), green culture (0.490), and visitor's attitude (0.439). Furthermore, "Beijing and Tianjin" is the most ideal region to promote e-exhibition in China. South Coast region ranked in second place as the most appropriate region for e-exhibition. The least ideal region of China for e-exhibition is the Southwest region that is less developed compared to other regions of China. The major practical policies in order to promote e-exhibition are the enhancement of international cooperation to hold an e-exhibition, use of electronic exhibition capacities (synchronous and asynchronous) and creating social sustainability awareness through the media and social network.

In order to conduct the research, the content was organized as follows: In the second chapter, the previous studies in two separate study groups (green economic revitalization and electronic exhibition in China) are examined, the result of which is the identification of literature gaps that this article seeks to fill in. Section 3 discusses the methods of research including primary survey, AHP and TOPSIS. In next Section, the empirical findings are reported and a discussion on the results is represented. In last Section, the concluding remarks are expressed, the limitations of research are discussed and some points to further research are recommended.

## 2 Literature review

The earlier studies can be divided into two different strands of literature. The first strand consists of earlier studies focusing on the characteristics of green economic growth recovery in China, while the second strand of literature concentrates on the characteristics of e-exhibition in China.

Generally, green growth recovery comprises all instruments and policies to promote GDP growth with regards to environmental concerns. Bai et al. (2022) analyzed the green economic recovery in China and concluded that due to the high fossil fuels consumption degree of this country, the Chinese government should try to fully support the process of green economic recovery in the post-COVID era. Especially during the epidemic period of the previous 2 years, COVID-19 has brought huge obstacles to green economy recovery and tourism (Shang et al. 2022a), and the long-term impact of tourism on green economy growth is positive, especially in high-income countries in Asia (Shang et al. 2023). In other study, Lin and Zhou (2022) studied the influencing factors to enhance green economic growth in China. They found out that technological innovation and transparent regulation are among the major factors positively push the Chinese economy toward greening. Zhao et al. (2022) expressed that green economic growth has different drivers in Chinese cities and policymakers should develop green plans in city level. Similarly, Shan et al. (2022) declared that, due to the difference in emissions of Chinese cities, the drivers to green economic recovery are various. In other study, Yin and Xu (2022) highlighted the role of green finance to promote green economic growth recovery in China. They believed that development of green economic sectors depends on development of green financing tools in the country. Zhong et al. (2022) studied the

relationship between green economic recovery and corporate investment in China. The major findings confirmed that investment can bring sufficient capital to green project leading to sustainable activities of China's heavy-polluting industries. Kong et al. (2022) discovered the direct positive impact of fiscal instruments on efficient green economic recovery of China. In a fresh study, Naseer et al. (2022) employed the Analytical Hierarchical process (AHP) to evaluate aspects of green economic efficiency in China. The major results reported that green economic growth is not a simple and one-dimensional matter in China. Rather, this discourse is about the need for social unity, green literacy and government support through the implementation of green fiscal policies in China. Bhuiyan et al. (2022) expressed that green economic recovery in China depends on green energy deployment and carbon mitigations. However, all these two mentioned factors need social and cultural requirements.

The second strand of literature focuses on e-exhibition as an efficient policy of sustainable development in China. In a study, Lu and Ouyang (2016) analyzed the specifications of exhibition industry in the province of Guangdong, China. The paper concluded that low level of greening is among the primary limitations of the industry in this province of China. Wang and Dai (2019) evaluated the green exhibition practice in China. They found out that China needs promotion of green, recyclable exhibition design concepts to carry out efficient sustainable exhibitions among cities. Li et al. (2021) investigated the visitor's perception of sustainability of exhibition in China. The survey's findings confirmed that respondents do not have enough knowledge about the positive benefits of virtual exhibition on sustainable development. Liu and Cheng (2022) studied the green literacy of exhibitors in China through the survey research method. The major findings revealed the importance of green knowledge, and values for improvement of green literacy of exhibitors in China's exhibition industry. Wang et al. (2022) focused on the Chinese exhibitors' sustainable willingness to participate in exhibitions in Beijing. The results depicted that service quality and communication are major influencing factors on exhibitor's willingness to participate in virtual exhibitions. It should be noted that the role of green literacy and social unity to improve e-exhibition industry in China is significant. Arif and Changxiao (2022) express that sustainable literacy and awareness of the deteriorating processes in Chinese society is necessary as an accelerator of sustainable development progress. In other study, Cotton et al. (2021) declared the green-behavior of individuals for energy savings and supporting sustainable development goals in the Chinese society needs to be improved by green literacy. Yuan et al. (2013) highlighted the importance of green literacy in China and proposed the policy of establishment of green universities to surge the green educations by academic leaders.

According to the aforementioned strands of literature, it can be concluded that the study of electronic exhibition and its effect on the recovery of green economic growth in China is of great importance. Due to the fact that holding an exhibition leads to the influx of capital, the boom of the tourism industry, transportation, job creation and income flourishing, and in China, the exhibition industry has experienced an increasing growth in the last two decades (holding more than 11,000 exhibitions in 2019 and 5400 exhibitions in 2020), therefore, understanding

the dimensions of electronic exhibitions as drivers of sustainable development in China should be given deeper attention. This issue has not been studied in terms of a regional survey in China. Therefore, this paper tries to fill these literature gaps and provide new and practical insights to the policymakers.

### 3 Theoretical background

The e-exhibition can affect green economic recovery through different transmission channels. Generally, using the environmental related technology in exhibition industry can promote energy saving, less energy consumption and waster generation, leading to environmental protection and sustainability. The electronic exhibition can be addressed as one of the new drivers with potential in advancing the goals of revitalizing green economic growth. Such exhibitions are also planned in economic literature under the title of eco-exhibition or sustainable exhibition, which in general means holding any exhibition through an electronic and virtual platform. Kamariotou et al. (2021) express that virtual exhibitions have many advantages for the host country. It provides a larger revenue with an appropriate support of environmental protections. Ario et al. (2022) believe that virtual exhibition can make a better experience for participators in terms of brand visibility, global reach and cost reduction. Considering the resumption of economic activities in the post-corona era and the need to hold various exhibitions for more interaction between manufacturers and traders, the policy of developing virtual exhibitions will be one of the important drivers of economic green revival of countries in the post-corona era. However, exploring the critical success factors of e-exhibition to promote green recovery is crucial. Among the primary factors, visitor's attitude, exhibitor's attitude, 24-h availability, international collaboration, support of environmental state institutions, and ICT (Information & Communication technology) infrastructure can be highlighted to study.

### 4 Methodology of research

In this paper, in order to find out the critical success factors of e-exhibition to make green economic recovery in China, the survey method and two multi-attribute decision-making of analytic hierarchy process (AHP) and TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) are employed. The sample of experts is selected from universities' professors in China. The invitation letters to experts were sent via their official email and we received 140 acceptance feedbacks to participate in this research. Table 1 reports the demographic information of participants in terms of educational field, gender, age, and nationality.

According to Table 1, 87.85% of the participants in this research are men and 12.15% are women. Also, most of the respondents (more than 51.42%) are between 41 and 50 years old. In terms of the academic field, 37.85% of the respondents are teaching in the field of energy economy and the rest have academic activities in the field of environment (37%) and marketing (50%).



**Table 1** Demographic information of experts

Demographic element	Types	Frequency	Percentage
Gender	Male	123	87.85%
	Female	17	12.15%
Age	30–40 years	38	27.16%
	41–50 years	72	51.42%
	> 51 years	30	21.42%
Educational field	Energy economics	53	37.85%
	Environment	37	26.43%
	Marketing	50	35.72%
Nationality	Beijing and Tianjin	34	24.28%
	North	24	17.14%
	Northeast	8	5.71%
	Central Coast	5	3.57%
	Central	16	11.43%
	South Coast	20	14.28%
	Southwest	19	13.57%
	Northwest	14	10%

Source: Authors

According to the examination of the problem in eight regions of China, 24.28% of the respondents are from region of Beijing and Tianjin, 17.14% from North and 14.28% from South Coast. After receiving the e-mail of acceptance to participate in this research from the selected professors of the university, the objectives of the research and e-exhibition criteria were sent to them to express their initial opinions to determine the final criteria. In addition, eight regions of China were sent to selected experts to score each of the criteria in these systems. The regions and e-exhibition are reported in Table 2 as follows:

To evaluate the importance of criteria, the AHP method introduced by Saaty (1988) is conducted. The analytical hierarchy process allows the opinions of individual experts (based on linguistic rating from equally preferred (number 1) to

**Table 2** Finalized alternatives and criteria of e-exhibition

Regions (Alternatives)	Criteria of e-exhibition
Beijing and Tianjin	Visitor's attitude
North	Exhibitor's attitude
Northeast	24-h availability
Central Coast	International collaboration
Central	Support of environmental state institutions
South Coast	ICT (Information & Communication technology) infrastructure
Southwest	Green culture
Northwest	

Source: Authors

extremely preferred (number 9)) to be analyzed through pairwise comparisons. The pairwise comparison matrix is listed in Tables 3:

In next stage, the normalized matrix is constructed based on the achieved pairwise comparison matrix. Then, priority vectors (Table 4) are calculated for all regions in regards to the criteria.

In continue, the TOPSIS is employed to find out the ideal solutions. To this end, the structure of the TOPSIS matrices is constructed for eight Chinese regions as follows:

In next step, the normalization of matrix in Tables 5 is done through Eq. (1):

$$r_{ij} = \frac{X_{ij}}{\sqrt{\sum_{i=1}^n X_{ij}^2}} \tag{1}$$

The normalized matrix is transformed into the weighted normalized one, and then, the positive and negative ideal solutions for the research problem (e-exhibition) can be defined as Eqs. (2 and 3):

$$A^+ = \left\{ \left( \max v_{ij} | j \in J \right), \left( \min v_{ij} | j \in J' \right) \right\} \quad \forall J = 1, 2, 3, \dots, n \tag{2}$$

$$A^- = \left\{ \left( \min v_{ij} | j \in J \right), \left( \max v_{ij} | j \in J' \right) \right\} \quad \forall J' = 1, 2, 3, \dots, n \tag{3}$$

In above equations,  $J$  and  $J'$  represent the benefit and cost criteria, respectively.

Table 6 shows the ideal solutions in Chinese eight regions for e-exhibition:

### 5 Empirical results and discussion

In this research, the opinions of 140 professors from different universities of China about e-exhibition are collected and analyzed through the survey, AHP and TOPSIS. According to Table 4, in China, the most important success factors of e-exhibition to have green economic recovery are the presence of International collaboration (0.592), green culture (0.490), and Visitor’s attitude (0.439). The interesting point is the belief of experts in the prerequisite of social culture of sustainable development for the success of e-exhibition. Tramonte and Willms (2010) expressed that cultural capital is an essential requirement to have appropriate reforms. The finding is in line with Wei and Si (2017) who expressed the role of Chinese cultural tradition to promote sustainable development. Furthermore, visitor’s attitude has been highlighted as a major critical success factor of e-exhibition. The importance of this success factor for an exhibition has been confirmed by a number of earlier studies like Leiberich et al. (2006) and Vecco et al. (2017). In fact, without the tendency of visitors to the electronic exhibition, the demand for such exhibitions has not reached the desired level and this policy of sustainable development will be associated with failure.

**Table 3** Pairwise comparison matrix

	Visitor's attitude	Exhibitor's attitude	24-h availability	International col-laboration	Support of environmental state institutions	ICT infra-structure	Green culture
Visitor's attitude	1	4	2	1	1/5	1	7
Exhibitor's attitude	1/4	1	3	1/3	2	1/5	1
24-h availability	1/2	1/3	1	1/5	1	1	3
International collaboration	1	3	5	1	1/2	1/4	1
Support of environmental state institutions	5	1/2	1	2	1	2	1/4
ICT infrastructure	1	5	1	4	1/2	1	3
Green culture	1/7	1	1/3	1	4	1/3	1
Sum	8.89	14.83	13.33	9.53	9.20	5.78	16.25

Source: Authors

**Table 4** Calculated priority vectors

Criteria	Priority vector's value
Visitor's attitude	0.4392
Exhibitor's attitude	0.2293
24-h availability	0.1034
International collaboration	0.5921
Support of environmental state institutions	0.4182
ICT infrastructure	0.2932
Green culture	0.4901

Source: Authors

In addition, the TOPSIS method explored the ideal Chinese regions based on the examined criteria of e-exhibition. According to Table 6, “Beijing and Tianjin” is the most ideal region to promote e-exhibition. This region is one of the major political, economic, social and cultural regions of China that has developed infrastructure for sustainable exhibition industry. This finding is in line with Hu et al. (2020) who highlighted the importance of sustainable development process in this region. South Coast region ranked in second place as the most appropriate region for e-exhibition. This region has many important international maritime ports where the e-exhibition would be more interesting and practical for merchandises. The next ideal Chinese region for e-exhibition is the central region comprising important cities like Wuhan, Zhengzhou and Changsha. The least ideal region of China for e-exhibition is the Southwest region (comprising cities like Yunnan, Sichuan and Chongqing) that is less developed compared to other regions of China. The region suffers from shortages of water and existence of poverty (Chen et al. 2021).

The non-uniformity of China's geographical regions in the success of electronic exhibitions shows the need for regional planning in China in the field of sustainable exhibition industry promotion. It is in line with Zhao et al. (2022) and Shan et al. (2022) that have confirmed the difference between Chinese cities in the field of green economic growth and carbon dioxide emissions.

To ensure the validation of empirical findings, the expert opinions' analysis is done by ANP (Analytic Network Process) and the results support that the major critical success factors of e-exhibition for green economic recovery are international collaboration, green culture, and Visitor's attitude for the case of China.

## 6 Conclusions and practical policy implications

### 6.1 Concluding remarks

Environmental issues are one of the main concerns of mankind on the planet. According to many experts, the post-Corona era gives countries a special opportunity to implement the issues of sustainable development and green economic

**Table 5** TOPSIS matrix

	Visitor's attitude	Exhibitor's attitude	24-h availability	International collaboration	Support of environmental state institutions	ICT infrastructure	Green culture
Beijing and Tianjin	0.0043	0.1393	0.3944	0.0058	0.0384	0.773	0.001
North	0.2984	0.2931	0.9193	0.0082	0.0038	0.2183	0.4822
Northeast	0.1931	0.7448	0.0049	0	0.2831	0.1322	0.0111
Central Coast	0.4492	2.3919	0.0194	0.0049	0	1.399	0.0213
Central	0	0.1443	0.6103	0.0943	0.1394	0.3392	0.9110
South Coast	1.3330	0.1932	0.4953	0.0392	0.1935	0	0
Southwest	0.1666	0.2311	0.5924	1.110	0.3942	0.0043	0.1364
Northwest	4.2944	0.1924	0	0.0031	0.3339	0.1944	0.2194
Sum	2.44	4.14	3.04	1.26	1.05	2.87	1.56
Radical of sum	1.222	2.068	1.518	0.631	0.526	1.433	0.781

Source: Authors

**Table 6** Ideal solutions of TOPSIS for e-exhibition

	Beijing and Tianjin	North	Northeast	Central Coast	Central	South Coast	South-west	Northwest
China Si*	0.1231	0.2884	0.516	0.3143	0.1149	0.3834	0.544	0.1193
Si <sup>-</sup>	0.5934	0.3693	0.0343	0.2773	0.4934	0.2284	0.0372	0.3924
Ci	0.8604	0.5943	0.0617	0.4784	0.6183	0.7493	0.0593	0.2994
Rank	1	4	7	5	3	2	8	6

Source: Authors

recovery. In this paper, the key success factors of e-exhibition on the recovery of green economy in China were studied through employing survey, hierarchical analysis, and TOPSIS methods. The research findings showed that in China, the most important success factors of e-exhibition to have green economic recovery are the presence of International collaboration (0.592), green culture (0.490), and visitor's attitude (0.439). In addition, Beijing and Tianjin'' is the most ideal region to promote e-exhibition. This region is one of the major political, economic, social and cultural regions of China that has developed infrastructure for sustainable exhibition industry. South Coast region ranked in second place as the most appropriate region for e-exhibition. This region has many important international maritime ports where the e- exhibition would be more interesting and practical for merchandises. The next ideal Chinese region for e-exhibition is the central region comprising important cities like Wuhan, Zhengzhou and Changsha. The least ideal region of China for e-exhibition is the Southwest region that is less developed compared to other regions of China. The important conclusion based on these findings is that geographical regions of China have different capacities in the field of electronic exhibition industry, and therefore the Chinese government should seek to formulate sustainable development plans specific to the characteristics of each region.

## 6.2 Policy implications

Based on the findings of this research, practical and strategic policies can be implemented as follows: In order to increase the efficiency of e-exhibition, the enhancement of international cooperation to hold an e-exhibition is recommended. Promotion of international cooperation in the field of electronic exhibition increases investment capacities and creates impactful green knowledge based on international experiences. Due to the development of information and communication technology infrastructure due to the social distance restrictions of the Corona era, the use of electronic exhibition capacities (synchronous and asynchronous) will improve the functioning of the sustainable exhibition system. Cultivation of sustainable development in society is an important issue that should be prioritized in the government's green economy programs in China. With the presence of green culture in the society, people's acceptance and desire for sustainable exhibition will increase. The attitude of visitors is considered an important issue in the success of sustainable

exhibition industry, which is obtained from understanding the environmental conditions of the country and the world. Creating awareness through the media and social network is an issue that Chinese government can implement in order to improve the attitude of visitors toward sustainable exhibition. The support of government institutions related to the environment for e-exhibition is an important practical policy. Therefore, it is suggested to increase the communication between institutions organizing sustainable exhibition and government institutions related to the environment in China (e.g., Chinese Research Academy of Environmental Sciences, and The National Environmental Protection Agency in China), and they can even sign a memorandum of cooperation with each other. The existence of an operational plan in the field of e-exhibition is considered one of the important practical policies that will be the Chinese government's road map to advance the goals of sustainable development. Another practical policy is to create support incentives for companies participating in e-exhibition industry. The government can consider tax exemptions or green loans for companies participating in sustainable exhibition industry, which will be an encouraging factor for the participation of more economic companies in this industry. In addition, the government's expansion of the green financing market would be an impactful policy implication to help SMEs who suffer from capital shortages improve their sustainability performances.

Another critical issue that needs attention by the Chinese government is to improve the level of energy literacy in the Chinese society and in different regions of the country. Investing in the popularizing of energy sciences, using media tools, developing courses related to environmental protection in schools and universities are among the possible practical policies in the field of increasing the energy literacy of the Chinese society.

### 6.3 Limitations and recommendations to further research

The discussion of economic green recovery in the post-corona era is a serious and controversial issue worldwide. Despite addressing its various dimensions, the discussion of sustainable exhibition industry has not been seriously and deeply studied. In this research, the success factors of e-exhibition for the recovery of green economy in the post-corona era of Chinese regions were studied. However, there were limitations in conducting this research. First, it is difficult to access experts in China through an English invitation email, which is the limiting factor in finding respondents in the cross-regional survey method. Second, due to being neglected, sustainable exhibition industry does not have a clear place in the minds of people and experts, and therefore, there is a need for initial correspondence and meetings to create a correct understanding of the dimensions of sustainable exhibition industry in the minds of those questioned. In the future researches, it is suggested that the target population should be from a specific class such as exhibitors or visitors of exhibitions, so that the opinions of non-experts about sustainable exhibition industry are also taken into account. In addition, it is suggested that a case study of the sustainable exhibition industry held in a country should be researched and the strengths and weaknesses of it should be examined from the perspective of exhibitors and visitors.

If possible, it is suggested that sustainable exhibition industry becomes a variable with quantification and its effect on economic green recovery or energy transition is considered in econometric modeling. The implementation of this recommendation makes it possible to obtain the relationship between sustainable exhibition industry and green energy recovery of China. It is also suggested to use the structural interpretative modeling method in the analysis of sustainable exhibition industry, which obtains the layers affecting the quality of sustainable exhibitions.

## Declarations

**Conflict of interest** We (authors) confirm that we have read, understand, and agreed to the submission guidelines of the journal. We confirm that all authors of the manuscript have no conflict of interest to declare. We confirm that the manuscript is the authors' original work and the manuscript has not received prior publication and is not under consideration for publication elsewhere.

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