Crafting digital business ecosystems for cultural and creative industries

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ABSTRACT

The Cultural and Creative Industries (CCI) thrive on innovation and creativity, necessitating robust cross-domain collaboration among diverse stakeholders. However, the current state of CCI co-creation mechanisms is marked by inadequacies. The primary objective is to provide practical and effective strategic guidance for co-creation endeavors within the dynamic CCI landscape. This study employs the Root Cause Analysis (RCA) method to identify and analyze critical elements for industrial co-creation, offering a comprehensive framework for understanding the intricacies of co-creation processes. The Cultural and Creative Industries Digital Business Ecosystem (CCI-DBE) model is then developed to encompass four foundational pillars: participation of multiple stakeholders, mechanism of co-creation, uniqueness of consumer experience, and output of co-created value. Participation of multiple stakeholders recognizes the importance of integrating perspectives from content creators, other companies, suppliers, and customers. The mechanism of co-creation delves into the necessity of a robust platform, supported by technological infrastructure, to facilitate seamless resource and knowledge exchange. The uniqueness of consumer experience emphasizes the need for tailoring offerings to meet consumers' unique experiential and meaningful needs. Output of co-created value focuses on enhancing product novelty, resource sharing, communication efficiency, information interaction, and cross-domain integration. This CCI-DBE model not only contributes to academic discourse but also provides actionable insights for practitioners seeking to navigate and enhance the co-creation process within the evolving CCI landscape. It stands as a valuable guide for fostering innovation, collaboration, and strategic alignment in the CCI sector.

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Introduction

Both Chinese Mainland and Taiwan are known for their rich and reputable culture heritages, which provides unbeatable foundation for cultural and creative industries (CCI). Despite that CCI has substantial growth in these regions in recent decades, research has rarely delved into as the factors contributing such growth to the business development by its nature of CCIIs, but reliant on social benefits, such as macro socioeconomic environment and governmental industrial intervention (Liang & Wang, 2020). This exemplifies the absence of a cooperative mechanism within the industry to integrate resources and capabilities comprehensively, aligning with the expectations of pre-determined users. Consequently, such mechanism is essential to generate sustainable advantages for all stakeholders involved in Creative and Cultural Industries (CCIs). Therefore, this research aims to 1) expand the contemporary comprehension of CCIs as a sector with a deficiency in resource integration mechanisms for business collaboration, thereby enhancing customer experiences and promoting culture, and 2) apply digital business ecosystem (DBE) (Senyo, et al., 2019) and construct a specific CCI-DBE to enable cultural organizations to engage in co-creation endeavors and systematically delineate the essential components, thus providing an actionable view on ecosystem strategy.

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The economic data of CCIs in the Chinese Mainland seems prosperous (UNCTAD, 2018), yet some scholars suspicious it was a superficial phenomenon shadowed by the country’s macro economy scale and government measure, not truly represents the revenue generated by this particular industry (Lee & Lin, 2022). This means challenges remain to be addressed by entities operating in CCIs. According to Yang & Černevičiūtė (2017), over 70% of cultural industries clusters operate at a deficit, with only 10% of them being profitable. The causes of this situation are multiple including issues such as suboptimal commercial models and weak management skills, among others (Yang & Černevičiūtė, 2017). These factors have led to a limited capacity to generate profits, resulting in a significant number of these enterprises failing within five years (Yang & Černevičiūtė, 2017).

Problems the CCI in Taiwan is different from those in Chinese Mainland. CCI business in Taiwan primarily emphasize original concepts and creative works, and lacks many others. First, they face challenges in establishing platforms to integrate research and development (R&D) resources to improve customer experiences and to penetrate to a broader market (Lee & Lin, 2022). Second, they financially rely heavily on subsidies and rewards from governmental projects. Ironically, evidence shows that, the Taiwanese government has subsidized billions of dollars to the CCI for just a disproportionate or fractional return in the past ten years (Lee, 2013). Possible reasons behind this dilemma may stem from the undifferentiated rewards to almost all participants in governmental projects, which in turn sacrificing outstanding projects that may require more resources.

CCIs in both the Chinese Mainland and Taiwan lack an effective mechanism to foster a reliable creativity bank, in which creators can easily store their creative output for any possible exploitation in the future. As Jacobides et al. (2024) mention, new organizational forms, such as platforms and ecosystems, arise to offer unique approaches in handling externalities, effectively addressing market or organizational failures. Creating such a co-creative platform with easy accessibility will definitely help creative professionals save creative that otherwise is fleeting on one hand, and providing prospective users a reliable source when a need emerges on the other. This study attempts to employ the concept of digital technology and co-creation theories in establishing a collaborative platform to get rid of this vicious circle.

We emphasize the concept of “co-creation” for two reasons. First, CCI products and services do not share the same “supply and demand principles” with other industry products. CCI products process more symbolic meaning and symbolic value. Therefore, consumers view experience as more important than practicality, resulting in uncertainty on the demand side (Yang & Černevičiūtė, 2017). Since it is difficult to find clear operating formulas to please consumers, CCIs need innovation all the time. According to Aldianto et al. (2020), promoting innovation involves enhancing co-creation, which can be achieved by bolstering the efficacy of relationships between creative industries and various stakeholders, including communities, consumers, suppliers, and other creative sectors. This effort aims to generate valuable information and knowledge to provide substantial support. Second, Lampel et al. (2000) propose that knowledge and creativity are two crucial keys to maintaining a competitive advantage. In this case, CCIs rely on the collective intelligence of creative communities.

CCIs should establish innovative systems to promote and market products while ensuring that these systems do not stifle individual inspiration. In this way, one of the core mechanisms of CCI development is to have a better co-creation and collaboration environment, which is basically a mechanism for cross-domain integration (Cunningham, 2002). As outlined by Abhari and Davidson (2016), co-creation networks offer valuable solutions to address the challenges faced by creative industries, particularly the escalating innovation costs and the shorter life cycles of content in CCIs. In recent years, there also have been many attempts to integrate CCIs, but there is still insufficient communication and integration between cooperative teams. Therefore, this study is based on this phenomenon and hopes to use innovative technology and business methods to develop a better model of co-creation in CCIs.

Digital transformation will bring new opportunities in response to the development of CCI content and knowledge demands. Chang et al. (2015) propose that digital technology will build cultural industry cross-brand equity, reduce the time cost of design and marketing, and better understand consumer preferences due to interaction with consumers, thereby creating cultural experiment value. CCIs after digital transformation can use digital technology to strengthen the capability of collaboration, co-creation, or codesign, achieving cross-domain resource integration of industries and creating value with stakeholders (Ramaswamy & Ozcan, 2018). Virtualized platform building connects the ecosystem, which enhances and embodies the value of experience, expanding wealth, welfare, and well-being in industries (Ramaswamy & Ozcan, 2018).

CCIs organizations are evolving from isolated entities to actively forming alliances and networks with external partners. Innovation is now more frequently generated through cross-domain processes that engage multiple industries (Santoro et al., 2020). Ramaswamy and Ozcan’s (2018) viewpoint requires “engagement platforms” to connect all stakeholders to create value together; “engagement platforms” can be developed anywhere in the ecosystem where the business operates.

In recent years, many enterprises have begun to build digital business ecosystems (DBE) within the process of digital transformation to reduce the costs of R&D, communication, sales and risks and to improve product innovation and service quality. With the benefit that DBE brings, CCIs may have better solutions to improve their co-creation mechanism. Galateau et al. (2014) believe that “co-creation is always a joint and mutual process”, which can enhance the exchange of heterogeneous experiences, acquire customer experience, context, interaction value, etc.

Developing a CCI DBE model will contribute to researchers’ ability “to develop work that speaks more effectively across disciplines and sites of cultural and creative practice” (De Bernard et al., 2022). However, few if any studies bothered to provide advice on how
to establish DBE for CCIs. Therefore, the main point of view in this research is that digital transformation provides CCIs with new changes and opportunities; thus, establishing a DBE can help CCIs test and solve the problem of co-creation, which has not been effective. Furthermore, this kind of research can “develop the potential for operating ecological terminologies—and ecological strategic frameworks—within policy processes in many locations” (De Bernard et al., 2022). Our research method is to analyze successful cases with similar experience, find the key success factors, and propose a development strategy for CCIs’ digital transformation using DBE.

**Literature Review**

Through a literature review of the industry characteristics of CCIs, we can gain a better understanding of the essential attributes required for establishing co-creation mechanisms within this context. Furthermore, it is apparent that applying the DBE theory from the business domain can systematically facilitate the development of feasible collaborative and complementary strategies between museums and enterprises.

**Theoretical and Conceptual Background**

Case of the Taipei Fine Arts Museum (TFAM) would be a good example to show the dilemma the CCI encounters. Number of visiting to the TFAM starts from 449,119 in the year of 2007, sharply grow to over one million in 2009, and then experiences a peak year in 2011 with over 1.3 million visiting. Unfortunately, it sharply plummets to a low level of around 300,000 visiting a year. One of the major causes may be attributed to the epidemic of COV-19 for those years after 2019. The data has shown that the visiting of the first five years (2007-2011) is 2.26 times over the most recent five years (2017-2021), shown as Table 1 and Figure 1, indicating a downturn trend in the past decade. The decline of this kind may account for poor cooperation and mutual support among CCI members for not aggregating industry resources within the CCI. For instance, the number of visitors mounted to the top in 2011 but experienced a sharp reduction of nearly 80%, or one million visiting in 2012. By consulting the municipal planning documents related to the Taipei City Department of Cultural Affairs’ art museums, it is inferred that the substantial decrease in 2012 can be attributed to the fact that 2011 coincided with the Republic of China's centennial celebrations. During that year, the Taipei Fine Arts Museum hosted numerous large-scale international cultural events, including the Taipei Biennial and the Taiwan Pavilion at the Venice Biennale. This means the market pie was not growing bigger, and these concurrent large-scale events cannibalized the number of visits to TFAM.

![Figure 1: Number of visiting to the Taipei Fine Arts Museum, 2007-2021; Source: Taipei Fine Arts Museum](https://www.tfam.museum/Common/editor.aspx?id=95&ddlLang=zh-tw)

Table 1 illustrates the number of visitors to the Taipei Fine Arts Museum from 2007 to 2021. There are seven years is growth around the 15 years, they are 2009 to 2011, 2014 to 2016, and 2019. There is a significantly increasing on number of visitors between 2009 to 2010, but comparing with each year in the three years, the number of visitor growth is decreasing. The similar pattern cab be seen in 2014 to 2016, although the number of visitors is also increasing. Due to the COVID-19 in the end of 2019, the account of visitors falls continuously. From the growth year between 2009 to 2011, the dramatic rise and decline in 2008 and 2012, it is obvious that trends are prone to fade quickly. Taking 2011 as the basis, it can be seen that except for the three years from 2009 to 2011, the number of tourists in other years basically maintained around 30% floating. The proportion of visitors in 2019 is the largest, with 38.8 percent. This is due to objective reasons COVID-19. Other values fluctuate for a variety of reasons, such as lack of sustained innovation to engage the audience.
Table 1: Statistics of Visitors to the Taipei Fine Arts Museum

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of visiting</th>
<th>Yearly Changes</th>
<th>Distance from the vertex</th>
<th>Index *</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>349,779</td>
<td>(128,378)</td>
<td>992,235</td>
<td>26.06%</td>
</tr>
<tr>
<td>2020</td>
<td>478,157</td>
<td>(42,732)</td>
<td>863,857</td>
<td>35.63%</td>
</tr>
<tr>
<td>2019</td>
<td>520,889</td>
<td>203,671</td>
<td>821,125</td>
<td>38.81%</td>
</tr>
<tr>
<td>2018</td>
<td>317,218</td>
<td>(70,734)</td>
<td>1024,796</td>
<td>23.64%</td>
</tr>
<tr>
<td>2017</td>
<td>387,952</td>
<td>(88,905)</td>
<td>954,062</td>
<td>28.91%</td>
</tr>
<tr>
<td>2016</td>
<td>476,857</td>
<td>57,575</td>
<td>865,157</td>
<td>35.53%</td>
</tr>
<tr>
<td>2015</td>
<td>419,282</td>
<td>25,044</td>
<td>922,732</td>
<td>31.24%</td>
</tr>
<tr>
<td>2014</td>
<td>394,238</td>
<td>114,739</td>
<td>947,776</td>
<td>29.60%</td>
</tr>
<tr>
<td>2013</td>
<td>279,499</td>
<td>(44,502)</td>
<td>1,062,515</td>
<td>20.83%</td>
</tr>
<tr>
<td>2012</td>
<td>324,001</td>
<td>(1,018,013)</td>
<td>1,018,013</td>
<td>24.14%</td>
</tr>
<tr>
<td>2011</td>
<td>1,342,014</td>
<td>72,114</td>
<td>-</td>
<td>100.00%</td>
</tr>
<tr>
<td>2010</td>
<td>1,269,900</td>
<td>125,195</td>
<td>72,114</td>
<td>94.63%</td>
</tr>
<tr>
<td>2009</td>
<td>1,144,705</td>
<td>700,514</td>
<td>197,309</td>
<td>85.30%</td>
</tr>
<tr>
<td>2008</td>
<td>444,191</td>
<td>(1,928)</td>
<td>897,823</td>
<td>33.10%</td>
</tr>
<tr>
<td>2007</td>
<td>446,119</td>
<td>/</td>
<td>895,895</td>
<td>33.24%</td>
</tr>
</tbody>
</table>

Source: Taipei Fine Arts Museum
* Percentage to the vertex year of 2011

Empirical Review

Definition and Characteristics of CCIs

In CCIs, there are two terms being discussed, “cultural industries” and “creative industries”. Those terms are described differently by various countries and scholars. "Creative industries", as defined by the UK Government's Department for Culture, Media, and Sport (DCMS, 1998), are “those industries which have their origin in individual creativity, skill, and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property.” In Galloway and Dunlop’s view (2007), “creative industries” is more than the “re-branding” of culture. Nonetheless, these two terms are all within a knowledge economy context. Policy makers in Taiwan tend to combine concepts of “cultural industries” and “creative industries”. According to the definition of Taiwan Executive Yuan (2002), “cultural and creative industries” refers to the industry that “originates from creativity or cultural accumulation, through the formation and application of intellectual property, and has the potential to create wealth and employment opportunities and promote the aesthetic quality of the whole people to improve the living environment of the people”.

Therefore, when discussing the definition, this article will take the literature containing these keywords and comprehensively analyze its characteristics to understand the nature of CCIs. Through these definitions, we believe that the difference between CCIs and other industries is that “CCIs place more emphasis on (1) the essence of creativity and (2) commercialization of culture while (3) intellectual property and copyright become the main part of sales (Galloway & Dunlop, 2007).

The Essence of Creativity

"Creativity" refers to the ability to produce something new, resulting from the concepts and inventions of one or many individuals who make the invention original and meaningful (Howkins, 2002). In CCIs, "creativity" is the core element (Galloway & Dunlop, 2007; Lee, 2013). In this case, Cunningham (2002) proposed the relationship between culture and creativity, arguing that there is a continuous relationship between culture and creative industries and that integration, customization, collaboration, and networking are the keys to development, and companies engaged in their industries must be “information intensive” to become “creative intensive”. Therefore, the flourishing of "creativity" requires interaction between context and organization in the industry chain; in this case, creativity should be an interactive linking process of new ideas and background contexts that includes creative workers, knowledge, network, and technology (Pratt, 2004; Lee, 2013).

Commercialization of Culture

According to Lee (2013), the economic character of CCIs is the commodification of culture through business production models. This also combines the notion of “symbolic meaning” proposed by Galloway and Dunlop (2007), for they mention that “symbolic meaning is the defining concept of culture and the economic value of goods which is derived from, or reflects, their cultural value”. Additionally, Borissova (2018) studies the economic symbiosis between cultural heritage and intellectual property, revealing that cultural value and digitization are means of commercial use in CCIs’ economic characteristics, and those (heritage and intellectual property) are recognized as a commercial asset of the creative industry.
Intellectual Property and Copyright Become the Main Part of Sales

Throsby (2001) addresses that the “use value” of cultural goods is concerned with the generation and transmission of symbolic meaning, so their “method of production” and output can potentially embody some form of intellectual property. Therefore, the concept of intellectual property and copyright to protect creative idea production is crucial to “allow people to own the products of their creativity (Galloway & Dunlop, 2007)” and to boost economic knowledge.

Co-creation, Co-design and Collaboration in CCIs

According to Sanders and Simons (2009), “co-creation is any act of collective creativity that is experienced jointly by two or more people”. They also separate the idea of co-creation with collaboration by defining that “co-creation is a special case of collaboration where the intent is to create something that is unknown in advance”. The concept of “codesign”, which can be referred to as “collective creativity as it is applied across the whole span of a design process”, is a “specific instance of co-creation” (Sanders and Simons, 2009).

Regarding co-creation in CCIs, Ramaswamy (2009) once said “co-creation is the most efficient and productive paradigm for any organization to strengthen its current practices, innovate new ones, and translate those practices into enduring value; while co-creation results in creating innovative value-adding product and service offerings, it is more than that—it’s a new information and communications productivity standard”. Thus, co-creation is not only an operation method in CCI organizations but also a key to influencing CCI development in every aspect. Furthermore, the rise of information and communication technologies has facilitated a shift to the co-creation of value through human experiences by establishing a firm’s network (Ramaswamy, 2011). Additionally, Abhari and Davidson (2016) proposed a general theoretical framework for implementing joint production in the creative industries based on three components: the co-creation environment, network coordination and experiential communication, emphasizing that “advanced information systems enable digital media and creative industries to use collaborative networks to facilitate creative coproduction.”

CCI Digital Transformation Development and Problems

There are many technology approaches to museum inside and outside management. In a museum education study by Recupero et al. (2019), technology integration support transforms teaching and learning in museum experiences for visitors, especially student groups. Then, technology is used as a mediating tool within the “museum mission and visitor experience”, which provides social and scientific knowledge for young visitors in diversified ways. Some museum research has recognized the influence of value co-creation on digital transformation and digital platforms, especially those technology enhance the importance of adding efficiency, effectiveness, and sustainability of museum management (Iandolo et al., 2022).

However, Vishnevskaya (2020) claims that there is a lack of management in the creation of goods in museums; when visitors are consumers, the lack of attractive creative products is obvious. Recent research on CCIs has recognized the importance of digital technologies (co-creative, co-value, platform, etc.) on ecosystem transformation (Loots et al., 2021). Because of the breaking and reshaping of rules, CCIs need to establish their own collaborative way to fit into the trend of digital transformation. And our research aims to provide the feasible strategy and fill the theoretical gap.

Ecosystems Perspective in CCIs

The theory of “ecosystems” was developed as early as the 1990s by sociologist Moore (1993), who proposed that the importance of concatenation and cooperation, each of the parts within the system, needs to be considered. However, the concept of a “business ecosystem” is motivated by biological ecosystems to cross-industry operations, and most discussions focus on organizational correlation dependence. Likewise, members in the business ecosystem need to balance and restrain each other through different mechanisms to achieve success and sustainability (Awano & Tsujimoto, 2021).

The ecosystem approach to entrepreneurship integrates perspectives from economics, strategic management, entrepreneurship research, and economic geography, emphasizing the mutually beneficial relationships between entrepreneurship and geographical location (Spigel, 2017). In this case, over the past few decades, numerous studies have emphasized the significance of entrepreneurial ecosystems (EEs) in promoting innovation and driving economic growth. The EEs characterizes successful entrepreneurship as a process that arises from the interplay between entrepreneurs and their surrounding environment, encompassing the dynamic local social, institutional, and cultural elements and participants that foster and support the establishment and expansion of new businesses (Malecki, 2018).

The prevailing emphasis in the literature on entrepreneurial ecosystems pertains to sectors that encompass technology-intensive, high-growth, and aspirational entrepreneurship (Stam, 2015). While there are overlaps between this type of entrepreneurship and entrepreneurship within the CCIs (for instance, in areas like software development and digital media), there could be unique ways in which the latter evolves as a result of the interactions between entrepreneurs and elements of the entrepreneurial ecosystem (Loots, et al., 2021).

CCIs encompass a wide array of domains, including the arts, cultural production, and creative sectors. These encompass a broad spectrum of activities, such as advertising, architecture, art, antique markets, crafts, design, fashion, film, music, the performing arts,
publishing, certain aspects of software development, television, and radio. These sectors prominently feature creativity, knowledge, and intellectual property as key components (DCMS, 1998). CCIs have been defined as “the set of agents in a market characterized by adoption of novel ideas within social networks for production and consumption” (Potts et al., 2008, p. 171). Therefore, Loots et al., (2021) suggest that “coalesce and are co-created in localized EEs may be key to explaining entrepreneurship in these types of industry.”

**Digital Business Ecosystem in CCIs**

The progress in digital technology has given rise to the emergence of novel collaborative organizational networks, exemplified by the DBE. A DBE represents a collaborative space comprising diverse entities that engage in value co-creation facilitated by information and communication technologies (ICTs) (Nachira et al., 2007). Since the DBE has the characteristics of resource sharing and information interaction, the operation mode of the basic ecosystem can solve the traditional structural (e.g., the industry chain cannot be integrated) and technical problems (e.g., the cultural content cannot be accurately presented through technology) of the cultural and creative industries (Ouyang et al., 2012). DBE goes beyond conventional industry limitations to promote open and adaptable cooperation and competition. For numerous organizations, DBE offers a pioneering method to harness resources like technology and specialized services from various sectors in order to address customer demands effectively (Senyo, et al., 2019).

In today’s modern business environment, value co-creation takes place through collaborative endeavors involving organizations, their partners, and customers. As a conceptual framework, DBE recognizes the significance of digital technology infrastructure and the network of entities in the process of value co-creation (Senyo, et al., 2019). Considering that DBE hinges on the synergy between diverse entities to create value, we perceive value co-creation as a pivotal catalyst in the establishment and functioning of DBE.

According to Senyo et al. (2018), the primary characteristics of DBEs are platform, symbiosis, co-evolution and self-organization. A platform denotes an assemblage of tools, innovations, and services that can be utilized by other partners within the DBE to improve their performance, foster innovation, and engage in collaboration (Selander et al., 2013). It’s essential to recognize that a DBE can encompass multiple platforms. Symbiosis entails the mutual interdependence among DBE partners, processes, and technologies (Senyo et al., 2017). Symbiosis results in entities synergizing to jointly generate enhanced value. As posited by scholars, no individual organization can produce value surpassing that of an ecosystem. Therefore, it becomes imperative for organizations to cultivate interdependence, leveraging their respective strengths and weaknesses to obtain greater value proposition.

Co-evolution pertains to a DBE’s capacity to collaboratively evolve alongside its partners as it progresses from one stage to another (Senyo et al., 2018). When shifts occur within a DBE due to opportunities or threats, key partners respond dynamically, while other interdependent participants also adjust to these changes. These co-evolutionary traits distinguish DBEs from other organizational networks, where individual entities may transform independently of others. Self-organization pertains to the capability of DBEs to assimilate insights from their environment and respond in accordance with those insights. Given the intricate nature of their relationships, DBEs learn and autonomously adapt as new demands, opportunities, and threats arise. Consequently, DBEs typically exhibit a dynamic nature (Senyo et al., 2019).

Dai et al. (2024) have contributed valuable insights to the attainment of a balance between value creation and value capture within ecosystems. Their findings suggest that organizations enhance the alignment of individual and collective interests through three essential processes: (1) redefining the value proposition, (2) improving the value co-creation process, and (3) optimizing the value configuration mechanism. Moreover, each of these processes involves internal coordination. Specifically, (1) redefining the value proposition entails identifying new opportunities for value creation and developing a comprehensive value vision, (2) improving the value co-creation process involves creating open value provision channels and making decisions regarding integration versus component strategies, and (3) optimizing the value configuration mechanism entails restructuring governance and incentive structures. These insights not only shed light on how to achieve effective value creation within an ecosystem but also provide a valuable research direction for CCI-DBE.

However, due to the complexity and multi-layered nature of ecosystems, many studies have merely listed a long series of related factors without deducing them based on the characteristics of CCIs. As a result, they can only offer limited insights for policymakers and business leaders (Alvedalen & Boschma, 2017). Since the characteristics of DBE align with the collaborative emphasis of CCIs, but there is limited discussion in the ecosystem literature regarding the industry-specific attributes of CCIs, this study aims to extract DBE elements from existing literature and establish a co-creation strategy model tailored to CCIs.

**Root Cause Analysis**

Root cause analysis is a methodical examination carried out in the aftermath of a production disruption (Ito et al., 2022). Its purpose is to identify the fundamental causes and implement corrective measures. The critical insight provided by this process lies in addressing the underlying factors responsible for a disturbance, rather than merely treating the immediate and apparent symptoms (Ito et al., 2022). This approach is particularly valuable for developing a digital business ecosystem model in cultural and creative industries. By comprehensively understanding and rectifying the root causes of challenges, organizations in these sectors can foster a more resilient and sustainable digital ecosystem, ensuring long-term success and adaptability.
In the development of the model for the CCI-DBE, a significant challenge lies in identifying critical bottlenecks and effectively enhancing co-creation within the CCI context. Root Cause Analysis (RCA) serves as a research method to address this challenge. RCA is a retrospective approach characterized by systematic investigation into past issues or incidents, with its primary goal being the identification of the underlying causes of these problems and the subsequent formulation of appropriate remedial actions (Balakrishnan et al., 2019). Initially employed in quality management within aviation and industrial sectors to uncover the causative factors behind errors (Gurley et al., 2021), RCA’s applicability has since expanded. The diversity of aspects and prerequisites inherent to the system under examination necessitates the use of various analysis strategies, as indicated by Solé et al. (2017). Given the multifaceted nature of CCI co-creation, this paper employs the concept of root cause analysis to comprehensively evaluate the influence of various design factors, as discussed in the literature review.

According to Andersen and Fagerhaug (2006, p.3), RCA involves identifying the causes of a problem and then devising solutions to eliminate these causes and prevent their recurrence. With this in mind, our objective is to identify the root causes responsible for the absence of established CCI co-creation and identify areas in need of improvement to enhance the creation of value in the CCI context. By employing RCA as the foundational model-building procedure, the CCI-DBE can systematically address its challenges by meticulously identifying root causes and crafting interventions tailored to enhance co-creation performance and value creation, in alignment with academic standards and practical applications.

To substantiate the adoption of RCA as the foundational framework for developing the CCI-DBE model, it is valuable to draw upon insights from the existing body of literature. Specifically, RCA serves as a means to discern both barriers and catalysts to performance. It accomplishes this by analyzing skill and knowledge gaps as well as performance disparities within workplace processes, culture, technology, and organizational structures (LaBonte, 2003). Within the context of the CCI digital business ecosystem, this method plays a pivotal role in pinpointing specific obstacles and opportunities that significantly impact the effectiveness of co-creation.

**Research and Methodology**

There are three main steps while applying RCA in this context. All causes were identified and first grouped into four categories, followed by further exploring the detailed causes for each category, as shown in Figure 2. We then refer to the literature and in-depth interviews with the CCI experts to propose an initial solution for each cause and conclude with the CCI-DBE.

**Finding the Proximal Cause**

The high failure rate of CCI co-creation was analyzed by examining pertinent literature, open data, and considering the department's specific circumstances. This analysis revealed the immediate factors contributing to the poor management quality of CCI co-creation, which encompassed four key aspects: stakeholders, platforms, consumers, and value co-creation (Figure 2).

**In Terms of Participation of Multiple Stakeholders**

The primary challenge in the context of CCI is the effective coordination and engagement of multiple stakeholders in the co-creation process, which is exacerbated by a deficiency in resource integration mechanisms for business collaboration.

**In Terms of Mechanism of Co-creation**

The problem in CCI, concerning the mechanism of co-creation, is that there is no effective platform to integrate all stakeholders. Due to factors such as time and location, real-time and transparent communication is hindered. This lack of efficient communication can lead to misunderstandings among members with diverse backgrounds during the co-creation process.

**In Terms of Unique Customer Experience**

The challenge in CCI, in terms of creating a unique customer experience, stems from the distinct attributes of products and services offered by the cultural and creative industries. These offerings deviate from the norms of everyday commodities and do not strictly adhere to conventional supply and demand principles. CCI products place a higher emphasis on conveying spiritual and symbolic meaning. Consequently, continuous innovation is required to engage consumers in co-creation processes and provide them with distinctive experiences. However, the current efforts in crafting such unique experiences require strengthening, as many cultural and creative products exhibit a high degree of homogeneity.

**In Terms of Output of Co-created Value**

One of the challenges facing CCI is the underutilization of its potential advantages. While there is a broad awareness of the innovative products and services, as well as the improvements in the R&D and production processes that can be derived through co-creation methods, the full potential of this tool for capturing co-creation value has yet to be effectively harnessed.
Discovering the Root Cause

We have analyzed the proximal causes of ineffective CCI co-creation and have identified the root causes. Our history showcases effective collaboration with customers to develop solutions. However, in the digital era, the demand for a faster pace is evident. The challenges can be summarized as follows:

As for the Participation of Multiple Stakeholders:

i. Insufficient engagement of key stakeholders: The inefficiency in resource integration mechanisms and coordination strategies significantly contributes to the absence of effective business collaboration among multiple stakeholders. When these mechanisms are not optimally designed or deployed, it creates bottlenecks in the allocation and utilization of resources necessary for co-creation projects. This resource misalignment impedes the smooth progress of collaborative efforts, leading to delays, misunderstandings, and reduced quality in the co-creation process.

ii. Divergent stakeholder priorities: Divergent stakeholder priorities often complicate cooperative projects within the CCI. As stakeholders approach projects with varying objectives and interests, it can be challenging to align these priorities harmoniously. This misalignment can result in conflicting expectations, disagreements, and difficulties in reaching a consensus. To enhance co-creation quality, it becomes imperative to establish a shared understanding and a unified vision among stakeholders to facilitate effective collaboration.

iii. Dearth of efficient communication channels: The lack of efficient communication channels serves as a significant barrier to seamless collaboration among multiple stakeholders. Ineffective communication platforms and tools hinder the timely exchange of information, feedback, and ideas. Without efficient channels, participants may struggle to stay informed and engaged, leading to misunderstandings and miscommunication, and a decrease in the quality of co-creation efforts.

iv. Inadequacy of coordination and cooperation mechanisms: The inadequacy of coordination and cooperation mechanisms necessitates a revamp to enhance the co-creation process. When these mechanisms are not properly established or maintained, it results in inefficiencies in task allocation, project oversight, and conflict resolution. As a consequence, collaboration becomes disjointed, and participants may struggle to work together cohesively, ultimately affecting the quality of co-creation in the CCI.

Mechanism of Co-creation:

i. Absence of centralized co-creation platforms: The absence of centralized co-creation platforms disrupts the smooth flow of communication and collaboration among stakeholders. Without a dedicated platform for integration, participants struggle to share ideas, insights, and information effectively. This fragmentation in communication and data sharing leads to misunderstandings and inefficiencies in the co-creation process, ultimately hindering its quality.

ii. Challenges in real-time communication due to time and location constraints: Constraints related to time and location hinder real-time communication among co-creation participants. As a result, critical discussions, feedback, and information exchange are delayed or compromised. These delays and disruptions create bottlenecks and misunderstandings, undermining the effectiveness of the co-creation efforts in CCI.
iii. Lack of effective project management tools: Inadequate project management tools impede the efficient coordination of co-creation projects. Without proper tools to oversee and manage the collaborative efforts, stakeholders may struggle to track progress, allocate resources, and ensure that tasks are completed on time. This lack of oversight and control can lead to misunderstandings, missed deadlines, and reduced co-creation quality.

iv. Limited training and skill development for co-creation participants: The limited training and skill development opportunities for co-creation participants leave them ill-equipped to contribute effectively to the co-creation process. Without the necessary knowledge and skills, participants may struggle to understand project requirements, communicate their ideas clearly, or resolve issues efficiently. These skill gaps can lead to misunderstandings and suboptimal co-creation outcomes, impacting the overall quality of collaborative efforts in CCI.

Unique of Customer Experience:

i. High degree of homogeneity among cultural and creative products: The prevalence of a high degree of homogeneity among cultural and creative products is a significant challenge in crafting a unique customer experience. When products and services within the industry exhibit strong similarities or conformity, it becomes challenging to offer distinctive experiences. Customers may perceive little differentiation among offerings, leading to a sense of monotony and reduced novelty in their interactions with the CCI. This lack of uniqueness can hinder the creation of a memorable and exceptional customer experience.

ii. Insufficient focus on conveying spiritual and symbolic meaning: Inadequate emphasis on conveying spiritual and symbolic meaning in cultural and creative products adds to the challenge of creating a unique customer experience. Unlike conventional products, CCI offerings prioritize spiritual and symbolic value. When this aspect is not effectively communicated or incorporated into the products, customers may fail to connect with the deeper significance of the offerings. This results in a missed opportunity to create a profound and unique customer experience rooted in cultural and symbolic depth.

iii. Limited market research to identify customer preferences: The limited investment in market research to identify customer preferences further exacerbates the challenge of crafting a unique customer experience. Without a thorough understanding of customer tastes, preferences, and expectations, it becomes difficult to tailor products and services to individual or niche needs. The lack of personalized offerings hinders the creation of unique experiences, as customers may not find products that resonate with their specific desires and aspirations.

iv. Lack of collaborative efforts to innovate and personalize offerings: The absence of collaborative efforts to innovate and personalize offerings is a critical barrier to achieving a unique customer experience. Co-creation and collaboration are instrumental in tailoring products to customer needs and preferences. When stakeholders, including creators, producers, and customers, do not actively engage in the innovation and personalization of offerings, the result is a lack of unique, customer-centric experiences. To overcome this challenge, a more concerted effort is needed to involve customers in the creative process and to foster a culture of innovation within the CCI.

Output of Co-created Value:

i. Underutilization of co-creation potential: The primary challenge in capturing co-creation value is the underutilization of its potential advantages. While there is a broad awareness of the innovative products and services, as well as the improvements in the R&D and production processes that can be derived through co-creation methods, the full potential of this tool remains largely untapped. The reluctance to fully engage in co-creation results in missed opportunities for generating and capturing value from collaborative efforts, hindering the realization of the full potential of co-creation.

ii. Insufficient integration of co-creation into the CCI context: Co-creation's underutilization is deeply rooted in the insufficient integration of co-creation practices within the CCI context. When co-creation is not seamlessly integrated into the industry's workflows and processes, it remains an isolated or sporadic activity rather than a fundamental approach to value creation. The lack of integration results in a disconnect between co-creation efforts and the overall goals and strategies of the CCI, leading to value creation challenges.

iii. Lack of an organization-wide co-creation culture: The absence of an organization-wide co-creation culture compounds the issue of underutilizing co-creation value. Co-creation should not be limited to a select few individuals or departments but should permeate the entire organization. Without a culture that encourages and supports co-creation as a fundamental approach to problem-solving and innovation, it becomes challenging to consistently harness and capture the value generated through collaborative efforts.

iv. Challenges in capturing and quantifying co-creation value: The difficulties in capturing and quantifying co-creation value also contribute to its underutilization. Co-creation outcomes are often intangible, making it challenging to measure their impact in quantitative terms. This hinders the ability to communicate the value co-created to stakeholders and decision-makers, and in turn, may lead to skepticism about the benefits of co-creation. To address this challenge, effective methods for capturing and demonstrating the value of co-creation need to be developed and implemented within the CCI context.
Our engagements frequently involve extensive discussions and immersion in the complexities of research and development. It is vital that we recognize the importance of co-creation. Instead of providing customers with a pre-packaged solution, our approach should be agile, involving collaborative efforts to iteratively address their evolving needs. Numerous studies propose that the process of digitalization necessitates a distinct approach to foster agility and increased participation from customers and ecosystem stakeholders in the co-creation of value (Ghezzi & Cavallo, 2020).

**Determine Improvement Measures**

In this part, we will elaborate more detail in Figure 3 to discuss the specific method to enhance CCI co-creation by using DBE strategy.

**Co-creation Stakeholders**

Participation of multiple stakeholders’ co-creation processes encompass collaborative endeavors involving parties engaged in direct interactions, with the objective of contributing to value for one or both parties involved (Abhari & Davidson, 2016).

**Mechanism of Co-creation**

It involves numerous interactive system-environments involving individuals and material entities, such as devices, facilitated by technological platforms that are empowered by digital technologies (Ramaswamy & Ozcan, 2018).

**Unique Customer Experience**

The role of consumers as resource integrators in the processes of value creation has garnered heightened attention in recent scholarly literature. Research indicates that consumers actively engaged in the value creation process during consumption tend to exhibit higher satisfaction levels compared to passive consumers (Prebensen & Xie, 2017).

**Output of Co-created Value**

The advent of information and communications technology, driven by the Internet, has significantly amplified interactions as a focal point for brand value. Human experiences have emerged as a fundamental element for brand innovation and value creation. Digitalized engagement platforms have now become an essential component of enterprise offerings (Ramaswamy & Ozcan, 2018).

**The CCI Digital Business Ecosystem**

Utilizing the collaborative characteristics offered by DBE among cross-sector participants and recognizing the demand within CCIs for creativity to enhance consumer experiences, this study extrapolates a DBE model for the cultural and creative industries based on elements of four dimensions. Dimensions in this CCI-DBE are participation of stakeholders, co-creation mechanism, customer experience, and co-created value, as shown in the Figure 3.

![Figure 3: CCI Digital Business Ecosystem Model; Source: Authors](image-url)
Participation of Multiple Stakeholders

In this model, multiparticipant hierarchies do not represent order and hierarchy; rather, they specify the overall sequence of relationships described in the literature on participant development. We use the literature and the perspectives of scholars in the industry to build a taxonomy of multiple participants from existing content and definitions. It is divided into a series of constituent elements through sorting and dismantling, and the elements are content creators, distributors, designers, experts, external agencies, enterprises, suppliers, producers, customers, and users. Therefore, a conceptual multiparticipant section is constructed. According to the concept of digital transformation, “broader individual, organizational, and societal contexts” (Legner et al., 2017), and the participants mentioned in the concept of cultural cycles in CCIs and the industry chain model (Taiwan Cultural and Creative Industries Development Annual Report, 2021), we can see the diversity of participation levels and the diversity of participants.

Mechanism of Co-creation

Co-creation approaches can provide important solutions to the complexity of CCIs, and we take the engagement platform proposed by Ramaswamy and Ozcan (2018) as the main way to connect all stakeholders. In this bridging process, the growth of co-creation is based on the growth of knowledge resources, which are shared among network members through cooperative activities. The creation of the co-creation platform includes technology-based and knowledge-based platforms (Bahn et al., 2015). For example, technology-based platforms are similar to mobile applications that allow customers to easily participate in co-creation activities using their mobile phones (Bahn et al., 2015). Manufacturers improve service processes through consumers using applications. This also is a classic case of consumers becoming co-creation members. Consumers themselves also provide manufacturers with R&D value. However, this premise is based on the development of technology. On the other hand, network members also can carry out co-creation activities through the sharing of knowledge resources to improve the value of products and services (Bahn et al., 2015).

Unique Customer Experience

Similar to the multiparticipant model structure, there is no order or hierarchy in the customer experience structure; it is divided relative to the different experiences that co-creation can bring to the customer.

According to Ramaswamy (2011), information and communication technology are major forces driving the co-creation of value from the human experience. Through corporate networks, the way people are informed, networked, and empowered has changed (Ramaswamy, 2011). Under this premise, consumers are no longer just passively accepting information and products from manufacturers or companies. In contrast, consumers also become part of an interactive role and positively influence the products and services offered by the company.

Different studies also have pointed out that the participation of consumers or end users in co-creation will have different impacts on consumer experience and attitudes. First, co-creation will help improve customer satisfaction (Vega-Vazquez et al., 2013) because products with high customer engagement are more likely to fit their needs. Second, since customers personally participate in the development of products and services, customers can put forward their usage needs and suggestions before the product is completed, helping enterprises to have a good customer understanding (Bharti et al., 2018). Third, customers’ sensory, cognitive, and affective experiences also will be influenced by co-creation. Werner (2016) proposed that co-creation will affect customer brand experience, especially in five dimensions: sensory, emotion, cognition, behavior, and relationship. Fourth, according to research by Farhana (2021), co-creation can help increase customer trust and satisfaction and thus increase customer loyalty. Finally, co-creation also can help digital product users (customers) obtain hyperpersonalized experiences, products, and services (Jain et al., 2021).

Output of Co-created Value

To find companies’ competitive advantage in fierce competition, we propose two points to add value. First, meeting the actual needs of customers is the basic element. In this case, it is necessary to better find the conditions of customer satisfaction in cooperation and to grow and communicate with customers together. Additionally, providing information to find a meeting point and providing a platform that can collect customer feedback are important processes of reverse value output. Finding the result of cooperation between the two parties is the ultimate goal of creating value and serving customers. Second, in the service process, the co-creation of value needs to be improved through communication efficiency, the sharing of information resources, cross-regional integration, etc. Digital technology can provide better technical support and services in the entire co-creation of value.

Through research from Pratt (2004), the production system of cultural and creative industries can be summarized into four main activities: original creation, production and infrastructure, reproduction and marketing, and exhibition sales and consumption authorization. According to those CCI production system stages, we the CCI-DBE can help to activate and facilitate these activities (Table 2) and, hereby, adapt the CCI production system by adding value at each stage and consequently strengthen the CCI production system.
Table 2: CCI-DBE Production System

<table>
<thead>
<tr>
<th>Production Stage</th>
<th>Key Activities</th>
<th>Main Tasks</th>
<th>Value of DBE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Original creation</td>
<td>Original ideas and production from creative materials and intellectual assets</td>
<td>Expand original material resources</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Production infrastructure and marketing</td>
<td>Creation of original concepts (prototype)</td>
<td>Multiple applications of original concepts</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Reproduction and consumption authorization</td>
<td>Provide consumers with access to CCLs’ products and services</td>
<td>Integrate marketing resources to improve customer experience satisfaction</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Exhibition sales and consumption authorization</td>
<td>Sell specific commodities through performance or functional venues</td>
<td>Digital technology brings consumers co-creation opportunities to give products new life</td>
</tr>
</tbody>
</table>

Source: Adapted from Pratt (2004)

Implications

The CCI-DBE model contribute significantly to the academic by extending the DBE theory into CCI industries. Unlike other DBE that mostly encompass the players from the same or related industries, this model is particularly valuable since it provides a concrete depiction of the diverse participants engaged in co-creation within the CCI sector, integrating stakeholders such as content creators (experts), other companies, suppliers (producers), and customers (users).

The practical implications of the CCI-DBE model extend beyond theoretical contributions, offering valuable insights for real-world applications within this particular industry. The model's practical implications will be evident in its ability to guide organizations of the system in implementing effective co-creation projects. By identifying and integrating various stakeholders, including content creators, other companies, suppliers, and customers, organizations can foster a more inclusive and collaborative ecosystem. The emphasis on platform-based co-creation mechanisms addresses existing challenges in co-creation effectiveness, providing a tangible solution for industry practitioners.

From a practical standpoint, the CCI-DBE model guides organizations in structuring their co-creation initiatives to realize shared value. This shared value encompasses aspects such as product innovation, efficient resource utilization, streamlined communication, interactive information exchange, and integration across diverse domains. By focusing on these practical implications, organizations can enhance their co-creation processes, resulting in more satisfying and meaningful experiences for both industry participants and end-users. The CCI-DBE model thus serves as a valuable tool for practitioners seeking to optimize co-creation efforts in the dynamic landscape of the cultural and creative industries.

Conclusion

This research has identified the root causes hindering the realization of effective co-creation in the CCI domain. By comprehensively addressing the multifaceted aspects of co-creation and categorizing these elements, the study has developed the CCI-DBE model. This model not only offers a structured framework but also provides actionable strategies for realizing the untapped potential of CCI co-creation. The outcome of this research lays the foundation for future endeavors in optimizing CCI value creation and fostering a dynamic, collaborative digital business landscape.

While this study has developed a CCI-DBE based on the principles of RCA through a review of the literature and observations of the phenomenon, which is expected to comprehensively address the current issues of ineffective and inefficient integration among various stakeholders in the CCI, evidence from real application remains absent. This is the first limitation and shall be actually employed in the real world to test its validity and reliability. Such empirical validation is critical to confirming the model's utility. Second limitation of the research is that RCA is the only method we employed to develop the model, and other possible methods were not included for consideration. This may be detrimental to the integrity and associated usefulness of the model. It is thus suggested to consult with other sources of information when applying this model. Moreover, it is also suggested to employ other approach other than RCA for a meaningful comparison. It is anticipated that the academic community will undertake such practical applications to both validate the model's efficacy and explore potential areas for further research.

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Conflicts of Interest: The authors declare no conflict of interest.
Reference


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