

Responsible research and innovation: Opportunities and challenges for UK-China collaboration in the creative industries

Abstract:

Responsible research and innovation (RRI) aligns research and innovation with societal values, needs and expectations. It increases the quality, relevance, social acceptability and sustainability of research and innovation outcomes. RRI is a key concept in the major research and innovation programme Horizon 2020, but it is unfamiliar to the creative industries. This paper explores the relevance of RRI to the creative industries and examines the opportunities and challenges for UK-China collaboration in this area. The research methods used were workshops for data collection and thematic analysis for data analysis. This paper has identified significant stakeholder interest in UK-China RRI collaboration in the creative industries, related emerging research and innovation trends, potential areas for collaboration and challenges. The main contributions of this paper include providing an understanding of RRI from the perspective of key stakeholders in both countries and offering practical next steps for further exploring UK-China RRI collaboration in the creative industries sector.

Keywords: Responsible Research and Innovation (RRI), Creative Industries, UK, China, collaboration

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1. Introduction

The creative industries encompass a broad spectrum of sectors where creativity, skill, and talent are integral to production processes. As articulated by Hesmondhalgh and Pratt, these industries span a wide array, including advertising, architecture, arts and crafts, design, fashion, film, music, performing arts, publishing, software, and video games. They serve as hubs of innovation, relying on intellectual capital and the creation of intellectual property rights. The United Nations Conference on Trade and Development (UNCTAD, 2008) further underscores that the creative industries are characterised by their significant creative content and originality, driving both economic growth and cultural development. Beyond contributing to job creation and export earnings, the creative industries play a crucial role in shaping cultural identities and fostering social cohesion. Moreover, they act as catalysts for innovation and collaboration across sectors, propelling technological advancements and enhancing global economic competitiveness (Keane, 2009). Their impact extends beyond mere economic measures to include broader societal benefits, such as enriched quality of life, increased creativity, and enhanced cultural diversity (Yúdice, 2004). Given the economic, social and cultural importance of the creative industries, they have a responsibility to contribute to the creation of a more equitable, inclusive and sustainable future.

Today, the creative industries represent dynamic ecosystems that interweave artistic expression, technological innovation and economic enterprise, significantly shaping the cultural and economic landscapes of nations worldwide. In both the UK and China, the creative industries are very important to national or regional economic development, with research and development (R&D) and innovation being the main growth drivers of the creative industries (Liang and Wang, 2020; DCMS, 2023a). Over the past two decades, the UK and China have developed a strong partnership to explore opportunities in a wide range of areas, including the creative industries. For example, in 2016, Ingenious Media (UK) and Chinese group Hejing Culture established a \$200M joint venture to support the co-production of independent films targeting the international market (BOP Consulting, 2018). Government funding and support is also important for the stimulation of relevant research and innovation activities and collaborations (UKRI, 2023a). In 2019, for example, funded by the UK Research and Innovation (UKRI), University of Nottingham, Shanghai Jiao Tong, Falmouth and the Communication University of China explored ways to co-design a ‘resonant character’ for Shanghai’s Performing Arts and Screen Industries (UKRI, 2019).

In the UK, UKRI plays a key role in driving research and innovation collaboration between the UK and China. Between 2007 and 2021, it has invested £440 million in relevant collaborations, bringing together more than 300 Chinese partner research organisations and companies with the UK (UKRI, 2023a). In 2022, UKRI announced its plan to establish a new UK-China Creative Industries Research and Innovation (R&I) Hub (UKRI, 2022). Brunel University London (BUL) was awarded the UKRI Fellowship grant for a one-year study to determine the scope and development of the hub (<http://www.creativeindustrieshub.com/>). The fellowship is supported by six working groups: Early Career Research (ECR) Group; Equality, Diversity and Inclusivity (EDI) Group; Education Group; Policy Group; Responsible Research and Innovation (RRI) Group; Small and Medium-sized enterprises (SME) Group. The working groups are led by early career academics from four UK universities and three Chinese universities. Each working group has at least ten working group members. These six working groups help Brunel University

London to explore the challenges and opportunities of establishing the UK-China Creative Industries R&I hub. This paper is a research output of the RRI working group.

Responsible Research and Innovation (RRI) is a key concept adopted by Horizon 2020, one of EU's Research and Innovation Programmes. It underscores the imperative of aligning research and innovation endeavours with societal values and needs, ensuring that progress is not pursued at the expense of ethical considerations, environmental sustainability, or social justice (European Union, 2014). This framework emphasises proactive engagement with diverse stakeholders throughout the innovation lifecycle, fostering inclusive decision-making processes and responsive governance mechanisms (Karner *et al.*, 2016). Through RRI, there is a concerted effort to integrate ethical, social, and environmental dimensions into research and innovation policies, promoting transparency, accountability, and public trust in science and technology (von Schomberg, 2011). By embracing RRI, stakeholders across academia, industry, government and civil society can collectively navigate the complex economic, environmental and societal challenges, while striving to create a more equitable and inclusive future.

The UK and China are both committed to developing equitable, inclusive and sustainable societies. As members of the United Nations, both countries have agreed to work towards achieving the 17 Sustainable Development Goals (SDGs) by 2030 (United Nations, 2024). As another example, the UK and China have committed to achieving net zero greenhouse gas emissions in the coming decades (the UK by 2050 and China by 2060). While both countries share common interests and goals in sustainable development, neither has a national strategy, policy or application framework to guide research and innovation activities related to the creative industries. Using RRI as a lens, this paper explores the opportunities and challenges for UK-China collaboration in the creative industries. The structure of the paper is as follows. First, the paper introduces the definitions, importance and applications of the term RRI, the creative industries in the UK and China, and the application of RRI in the creative industries in the UK and China. It then explains the research methodology used by the researchers. This is followed by a report on a workshop focusing on RRI with academics and industry practitioners from both countries. On this basis, the paper reflects on the key themes that emerged from the workshop and gives suggestions for future collaboration between the UK and Chinese creative industries on RRI.

2. Literature review

2.1 Definition, importance and application of RRI

Responsible Research and Innovation (RRI) has emerged as a prominent framework within the realm of Science, Technology, and Innovation (STI), often referred to as 'research and innovation for and with society' (Owen *et al.*, 2012). It encapsulates a set of principles and practices aimed at ensuring that research and innovation processes are conducted ethically, inclusively, and sustainably (Koops, 2015, p. 3) to ensure that 'processes and outcomes of research are aligned with societal values' (Jirotko *et al.*, 2017, p. 62). According to von Schomberg (2011, p. 9), RRI can be defined as 'A transparent, interactive process by which societal actors and innovations become mutually responsive to each other with a view to the (ethical) acceptability, sustainability, and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)'. This definition underscores the proactive and anticipatory nature of RRI, emphasising its focus on societal values and aspirations.

Jakobsen *et al.* (2019) summarise three key features of past RRI literature. Firstly, RRI has a strong link to policy formulation or implementation, stimulating discussions about research targets and innovation towards ‘desirable’ social benefits. Secondly, mechanisms for reflection and evaluating inclusion in the research and innovation process are critical in RRI. Owen and Goldberg (2010) stress that responsible innovation requires a proactive approach to risk assessment and management, with an emphasis on transparency, accountability and responsiveness to stakeholder concerns throughout the innovation life cycle. Lastly, responsibility should be ‘collective’ (von Schomberg, 2008; Stilgoe *et al.*, 2013), involving all stakeholders such as citizens, businesspeople, policymakers, research funding institutions and civil society organisations.

In recent years, the concept of RRI or related principles have received increasing attention from academia, industry and government, and have been widely adopted. For example, RRI is a cross-cutting issue of the Horizon 2020 (the European Union’s research and innovation funding programme for 2014-2020) and is used as an approach for integrating citizens’ interests and values into science and innovation issues, policies and activities, as well as for anticipating and assessing the potential impacts and societal expectations of research and innovation (ORION, 2024). Central to this approach is the engagement of stakeholders (e.g., researchers, policy makers, citizens, businesses and not-for-profit organisations) at every stage of the research and innovation process, from design to implementation to evaluation (ORION, 2024). The UK’s Engineering and Physical Sciences Research Council (EPSRC)’s framework for RRI describes an approach to RRI (referred to as AREA) in which researchers anticipate, reflect, engage, and act on the potential impact of their research such as ‘economic, social, and environmental’ impact (EPSRC, 2024). The US Socio-Technical Integration Research (STIR) framework is another example. However, at the level of individual countries, RRI has not been translated into national policy or regulatory measures (Nazarko, 2020). Some European and US researchers have advocated for the inclusion of RRI in national policy agendas (Nazarko, 2020; Kuzma, 2022).

2.2 Creative industries in the UK and China

2.2.1 *Creative industries in the UK*

The UK has been at the forefront of shaping and promoting the concept of the creative industries on a global scale. Since the establishment of the Department for Culture, Media, and Sport (DCMS) under the Blair government in 1997, the UK has spearheaded policy-driven initiatives to nurture the growth of the creative industries. Following its inception, the DCMS released two pivotal documents, namely the Creative Industries Mapping Document in 1998 and 2001. These documents delineated strategic approaches for fostering the development of the creative industries, focusing on enhancing organisational management, talent cultivation, and financial support mechanisms. In 2006, the Comparative Analysis of the UK’s Creative Industries categorised the creative industries into three clusters: Production Industries, Service Industries, and Arts and Crafts Industries. This comprehensive analysis provided invaluable insights into the structure and dynamics of the creative industries in the UK, paving the way for targeted interventions and support measures. According to the most recent government definition, the creative industries comprise the following sub-sectors: (1) Advertising; (2) Architecture; (3) Crafts; (4) Design and designer fashion; (5) Film, TV, radio and photography; (6) Museums, galleries and libraries; (7) Music, performing and visual arts; (8) Publishing; and (9) software and computer services (including video games) (CIPEC, 2022).

Economically, the creative industries contributed £101.5 billion to the UK economy in 2017 (DCMS, 2019). Through initiatives like the Creative Industries Clusters Programme, the UK government continues to invest in fostering innovation and collaboration within creative sectors (DCMS, 2023c). Moreover, in terms of workforce generation and social equality, the DCMS has allocated £950,000 to deliver the second phase of the Creative Careers Programme (CCP) until 2025, with a focus on engaging young people from low socioeconomic backgrounds (DCMS, 2023b). Forecasts suggest that the gross value added by the creative industries could reach close to £130 billion by 2025, with a year-on-year increase of 3.9%, potentially creating approximately one million new jobs by 2030 (Bazalgette, 2017). Through these concerted efforts, the UK has emerged as a global leader in fostering the growth and competitiveness of the creative industries, setting a precedent for other nations to emulate in harnessing the economic and cultural potential of creativity and innovation.

2.2.2 Creative industries in China

Since its inception in 2004, the inaugural ‘Shanghai Creative Industries Development Forum’ has marked a pivotal moment in China’s creative industries, heralding two decades of remarkable growth (Li, 2011). According to the Creative Industries Assessment Centre survey, creative enterprises in China experienced an average growth rate of 60% between 2006 and 2009, surging to 80% in 2008 amidst the global financial crisis (CIDA, 2009). More recently, the 2023 Conference on Propaganda, Ideology, and Cultural Work in China underscored the imperative of promoting the prosperity and development of cultural undertakings and industries (Wang and Xia, 2024). The cultural industry serves a dual function, optimising economic structure while meeting diverse spiritual and cultural needs, thus driving the ‘dual unification’ of social and economic benefits. Characterised by high added value, low energy consumption, and minimal pollution, the cultural industry embodies robust innovation, integration, and adaptability, epitomising a green and low-carbon economy. The creative industries have facilitated China’s transition from ‘Made in China’ to ‘Created in China’.

In the industry development model of the creative industries, China has established cultural and creative industry parks as important pathways and carriers for economic development transformation, industrial scale, and subdivision field development. While promoting industrial agglomeration to generate economies of scale, they also play a crucial role in the cultural undertakings and cultural industries of the country and cities. Data shows that since 2012-2016, the number of cultural industry parks in China has continued to grow steadily, from 1457 to 2543, an increase of 1086 in five years, with an average annual growth rate of 14.9% (China Business Industry Research Institute, 2018a). This indicates that regions across the country attach importance to the development of the cultural and creative industries, enabling them to form a competitive advantage and cluster effect in a short period. For example, the Zhuhai V12 Cultural and Creative Industry Park, with ‘innovation, creativity, and entrepreneurship’ as its development concept, has introduced a total of 148 cultural and creative enterprises, involving multiple fields such as animation and game development, figurine production, digital imaging, film and television production, and artistic creation (China Business Industry Research Institute, 2018b). Through the advantage of regional connection, the park helps enterprises integrate and disseminate brand influence and market resources to surrounding cities such as Guangzhou, Zhongshan, Jiangmen, Shenzhen, Hong Kong, and Macau (China Business Industry Research Institute, 2018a).

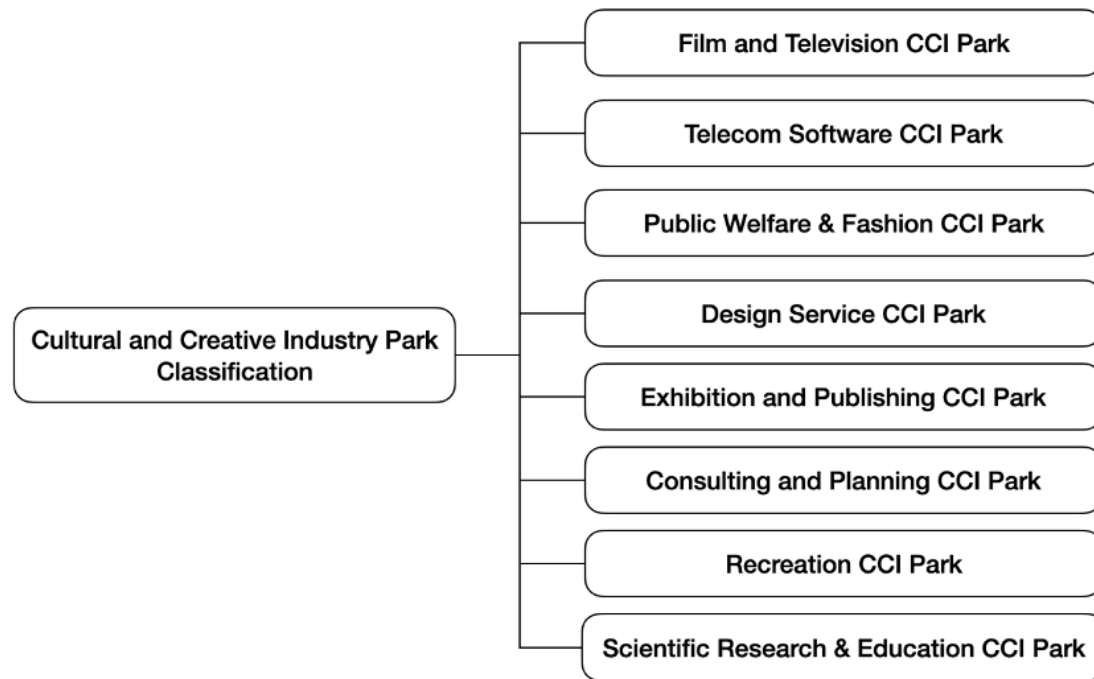


Figure 1 Classification of Cultural and Creative Industry Parks (China Business Industry Research Institute, 2018a)

2.3 Application of RRI in the creative industries in the UK and China

2.3.1 Application of RRI in the UK

As an active member of the EU's Horizon 2020 programme, UK academia and government are at the forefront of applying the RRI approach (UKRI, 2023b). In relation to the creative industries, the importance of 'responsibility' and 'research and innovation' has been recognised by researchers, government and industry. Although not formally used, RRI has long been applied in a number of university-led research projects on the creative industries. The University of the Arts London (UAL)'s Centre for Sustainable Fashion, for example, since its inception in 2008, has continued to produce an extensive range of research to explore the possibilities of applying design for sustainability to fashion (UAL, 2024). One of its aims is to set ecological, social, economic and cultural agendas in government, business and the public sphere (UAL, 2024). Aspects of the EPSRC's RRI AREA framework have been operationalised into design prompt cards to inform and direct responsible innovation and research (Portillo *et al.*, 2023). These are one of the only examples of concrete tools to help researchers to reflect on and design more responsible research.

In terms of government initiatives, UKRI has invested £120 million in the creative industries research and innovation through its Creative Industries Cluster Programme (CICP) between 2018 and 2023 (UKRI, 2023). In 2023, DCMS (2023a) published a key document, the Creative Industries Sector Vision, which set out the shared ambition of government and industry to support the UK's creative industries. In the document, DCMS highlighted the value of UKRI's investment in research and innovation in the creative industries and announced its continued

public funding support for the CICIP and other creative industries research and innovation programmes, schemes and funds.

When introducing the DCMS's vision document to the public, Christopher Smith (2023), UKRI Sector Champion for the Creative Industries, mentioned the word 'responsible' three times:

- Using UKRI's funding, an industry-led innovation network and three academic networks are working closely to drive sustainable and responsible practices in the fashion and textile industry.
- UKRI will support place-based, responsible, innovation-led growth in the creative industries.
- There are many ways the creative sector can create positive change, such as 'designing in sustainability for a greener future'; 'increasing the adoption of sustainable practices within the sector and beyond'; and 'finding responsible and trustworthy creative applications for technologies such as artificial intelligence'.

2.3.2 Application of RRI in China

With the acceleration of R&D capabilities in China, there is an urgent need to establish a revitalised scientific and innovation process that integrates 'responsibility' and socio-ethical factors. As China develops its Science, Technology, and Innovation (STI) strategy, European STI policies have been extensively referenced and studied (Gao *et al.*, 2019). Given the close relationship between Responsible Research and Innovation (RRI) and STI strategy development, RRI has garnered significant attention and research focus within Chinese academia. According to a literature review conducted by Wang and Long (2023, p. 6), RRI is commonly referred to as 'Responsible Research Innovation' and 'Responsible Innovation' in Chinese, expressed as '负责的创新', '负责任研发与创新', and '责任式创新'. Their analysis of 77 sampled articles reveals distinct themes in RRI research, including ethics, risks associated with new technology innovation, science education, public engagement, and governance. Among the case study articles focused on 'responsible innovation', prominent topics include artificial intelligence governance, researchers' responsibilities in innovation, big data technology innovation, and the innovative development of the cultural industry. These findings underscore the considerable interest and emerging trends in RRI research within these areas in China.

The unique characteristics of the Chinese RRI practice are strongly associated with government policies and national development goals, and the priorities of societal contribution are emphasised in science development and application (Wittrock *et al.*, 2021). Guided by the 'new era of socialism with Chinese characteristics' under Xi Jinping to accelerate the economic development while also emphasising the science contribution to socialist society and Chinese values from 2012, the Responsible Research Innovation practices in the cultural and creative industries has been reflected highly in the Corporate ESG (Environmental, Social, Governance) practices in China. The published 2022 Corporate Social Responsibility ESG Innovation Trend Insight Report included nearly 300 cases collected from retail, internet, consumption, transportation, education and other categories and emphasised digitalisation, social responsibility, and green transition (Southern Metropolis Daily, 2022). Among all cases, it is noticeable that the game company iDreamSky demonstrated a purpose-driven business model through game innovation, anti-addiction of minors, improved user privacy, increased product liability, and community investment (Games Daily, 2022). By co-designing the game levels with

children and parents to ensure the game's educational value. Based on the users' creations in the game, iDreamSky launched a digital art collection in 2021 and donated all sales to Chen Xiangbo Art Charity Fund to support art education.

2.4 The need for RRI in collaboration between the UK and Chinese creative industries

The UK's Creative Industries Sector Vision (DCMS, *Creative Industries Sector Vision 30*) emphasises the UK government's ambitions to capitalise on the technological opportunities presented by the Fourth Industrial Revolution to keep its creative industries at the forefront of increasing international competition. The report also highlights the importance of unlocking the growth potential of the creative industries to create opportunities for people across the country and to drive economic, cultural and social development (4). In China, in 2016, the government clearly stipulates the cultural and creative industries development as a priority in its national industry development strategy in its 13th Five-Year Plan (Liang and Wang, 2020). The 14th Five-Year Plan, published in 2021, declares that the Chinese government will continue to 'upgrade the structure of the cultural industry', 'promote the employment of new technologies and digitisation', and 'deepen international cultural cooperation' (The State Council, 2021). Driven by similar goals and ambitions, there is potential for the UK and China to further promote and deepen research and innovation collaboration in the creative industries through the UK-China Creative Industries R&I hub.

In its 2023 Creative Industries Sector Vision report, the UK government states that one of its aims for 2030 is to '[maximise] the positive impact of the creative industries on individuals and communities, the environment and the UK's global standing' (DCMS, 2023a, p. 6). Similarly, in the 2017 report on the UK-China Joint Strategy for Science, Technology and Innovation Cooperation, Wan Gang, who was then China's Minister of Science and Technology, states that 'As a responsible developing country, China is willing to engage actively with global innovation network and deepen cooperation with all other countries, to jointly address major challenges and to build a community of shared future for mankind' (BEIS, 2017). However, both the UK and China do not have RRI policies and frameworks for the creative industries to guide researchers and practitioners. In addition, there are few empirical studies that explore Chinese responsible innovation frameworks and how these frameworks intersect with Western responsible innovation frameworks (Li *et al.*, 2023). Therefore, beyond the economic and cultural themes, RRI could and should be considered as a key theme in the cooperation between the two countries in the creative industries and be embedded in future research and innovation activities. As a first step, stakeholders in the creative industries in China and the UK need to have initial discussions on RRI.

3. Methodology

A 2-hour UK-China creative industries RRI collaboration workshop was held in September 2023. The purpose of the workshop was to collect data on RRI opportunities and challenges for UK-China creative industries collaboration. Ethical approval for the research was obtained from Brunel University London, the lead institute for the UK-China Creative Industries R&I Hub Fellowship.

The workshop was held online through Zoom, an online meeting tool, and Miro, an online collaborative whiteboard platform. Participants of the workshop were academics and industry

practitioners from both countries. The sampling strategies used were simple random, convenience and snowball sampling. Participants were volunteers recruited through social network platforms (i.e., LinkedIn and WeChat) and by emails. All of them have a background in the creative industries or RRI and are interested in China-UK collaboration. Eight of them have experience of UK-China RRI collaboration. The participants were given an information sheet explaining the background to the study and the purpose and details of the workshop. Consent to participate in the study was obtained from all the participants.

A total of 16 participants from 15 universities and organisations attended the workshop, see Table 1 for participant information. The table uses the UK's Creative Industries Policy and Evidence Centre's classification of the nine subsectors of the creative industries: (1) advertising and marketing, (2) architecture, (3) crafts, (4) design and designer fashion, (5) film, TV, video, radio and photography, (6) IT, software and computer services, (7) publishing, (8) museums, galleries and libraries, (9) music, performing and visual arts. As Table 1 shows, the participants' areas of research or work span five sub-sectors of the creative industries.

Table 1 Participants of the RRI workshop

Participant number	Organisation	Country	Area(s) of research or work	Job Title	Gender	Experience of UK-China RRI collaboration
1	University of Kent	UK	IT, software and computer services	Professor	Male	Yes
2	University for the Creative Arts	UK	IT, software and computer services	Professor	Male	No
3	Zhongnan University of Economics and Law	China	IT, software and computer services	Professor	Female	No
4	Northumbria University	UK	Design and designer fashion	Professor	Male	Yes
5	Lancaster University	UK	Design and designer fashion	Professor	Male	No
6	Middlesex University London	UK	Museums, Galleries and Libraries	Senior Lecturer	Female	Yes
7	Heriot-Watt University	UK	Design and designer fashion	Assistant professor	Male	Yes

8	Tsinghua University	China	Design and designer fashion	International research and collaboration lead/manager	Female	No
9	Central Conservatory of Music	China	Music, performing and visual arts	Professor	Female	Yes
10	Southwest Jiaotong University	China	Design and designer fashion	Associate professor	Female	Yes
11	Zhejiang Fashion Industry Federation	China	Design and designer fashion	Director	Female	No
12	University of Leeds	UK	Advertising and marketing	Lecturer	Female	Yes
13	University of Leeds	UK	Design and designer fashion	Lecturer	Female	No
14	Aston University	UK	Design and designer fashion	Lecturer	Female	No
15	Brunel University London	UK	Design and designer fashion / Museums, Galleries and Libraries	Professor	Female	Yes
16	V&A Dundee	UK	Design and designer fashion	Head of Design Research	Female	No

During the workshop, the participants were asked to complete four tasks using Miro (using sticky notes to answer questions on pre-designed Miro boards; discussion was allowed).

- The first task was to share their industry or research interests and the relevance between their interests and RRI.
- The second task focused on the reasons why the creative industries in China and the UK need to collaborate on RRI, as well as potential areas of collaboration.
- The third task is to explore how the creative industries in both countries could collaborate on RRI and to identify related challenges.
- The last task was to make additional recommendations and suggestions.

The aim of this workshop was to explore the opportunities and challenges of UK-China creative industries collaboration through the lens of RRI. The design of these four tasks enabled the study to collect relevant data to provide an initial understanding of opportunities and challenges.

To encourage discussion, the participants were divided into four groups to complete the tasks in Zoom breakout rooms. Table 2 shows how the participants were grouped: (1) each group has participants from at least two different creative industries or disciplines to encourage cross-disciplinary discussion; (2) group members speak the same languages, either English or Mandarin or both. Participants used Miro’s sticky note feature to add answers to task questions on the task boards designed by the researchers. Their answers were used for data analysis.

Table 2 Grouping information

Group number	Areas of research or work (group members)	Participant Number (see Table 1)
Group 1	IT, software and computer services; Design and designer fashion	1, 2, 3, 4, 5
Group 2	Design and designer fashion; Museums, galleries and libraries	6, 7, 8
Group 3	Music, performing and visual arts; Design and designer fashion; Advertising and marketing	9, 10, 11, 12
Group 4	Design and designer fashion; Museums, galleries and libraries	13, 14, 15, 16

The data collected in the workshop represented what the participants wrote on the sticky notes on the Miro board (see Figure 2 for an example). Some of the sticky notes were written in Chinese. The researchers translated all the Chinese messages into English before analysing the data. The participants’ responses on the sticky notes are anonymous. This ensures that they can freely contribute ideas.

Group 4: Task 3 / 第 4 组: 任务 3

Responsible Research and Innovation (RRI) refers to the alignment of research and innovation with society values, needs and expectation. Relevant topics include, but are not limited to, environmental sustainability, health, poverty, education, privacy, gender, risk, ethical issues.
 负责任的研究和创新(RRI)是指研究和创新与社会价值观、需求和期望保持一致。
 相关主题包括但不限于环境可持续性、健康、贫困、教育、隐私、性别、风险、道德问题。

Please answer the questions in the box from the perspective of your personal industry and/or research interests and/or experience. Feel free to discuss with your group members. 请从您个人行业和/或研究兴趣和/或经验的角度回答框中的问题。欢迎与您的小组成员讨论。

1. Use sticky notes to brainstorm how the UK and Chinese creative industries could collaborate on responsible research and innovation (15 mins)
 使用便利贴集思广益, 讨论英国和中国创意产业如何在负责任的研究和创新方面进行合作(15分钟)

2. Use sticky notes to brainstorm the challenges of the UK and Chinese creative industries RRI collaboration (15 mins)
 使用便利贴集思广益, 讨论英国和中国创意产业 RRI 合作面临的挑战 (15分钟)

Figure 2 Data collection via Miro on sticky notes

The method of data analysis used is thematic analysis. Thematic analysis is a qualitative data analysis method that can be used to identify, analyse and interpret patterns of meaning (i.e., themes) within data (Clarke and Braun, 2017). Codes and themes were generated from the raw data collected at the workshops following a systematic procedure: the researchers generated codes (i.e., sub-themes) based on the raw data and then compared the codes to search for, review and define themes; some of the data were coded directly into themes (see Figure 3).

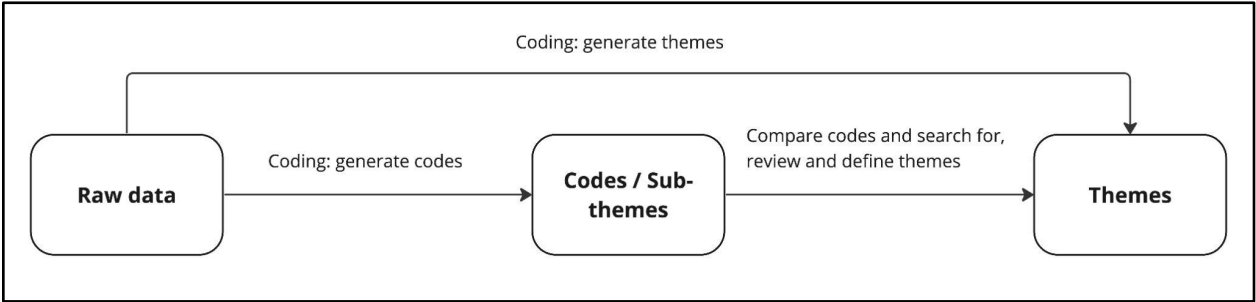


Figure 3 Thematic analysis and coding procedure

Data from each of the four Miro tasks were analysed separately (see Appendix 1). Table 3 shows the thematic analysis results: 44 themes and 57 codes (i.e., sub-themes) were generated from raw data.

Table 3 Thematic analysis results.

Tasks	Themes	Codes / Sub-themes
Task 1 (Q1): participants' industry or research interests	computer sciences and applications	AI; AI-related areas; Other areas
	design	UX design; policy and strategy; design for health; co-design
	fashion	sustainable fashion; textiles and health; fashion design innovation; product-market strategy; colour; fashion sector
	music	sound design
	culture	cultural revitalisation; cultural heritage
	healthcare	healthcare; elderly care
	ethics	ethics
	other	N/A
Task 1 (Q2): relevance of participants' industry or research interests to RRI	sustainable futures	environmental sustainability; sustainable development
	healthcare	ageing issues; education; health and social care
	responsible technology	responsible AI; cyber security and privacy; technology application
	design methods	design strategy; problem solving; design for social innovation; co-design; user-centred design; inclusive design
	education	education
	privacy, ethical and legal issues	privacy, ethical and legal issues
	digital innovation	digital fashion
	social mobility	gender equity
	value and impact	value and impact

Task 2 (Q1): why the UK and Chinese creative industries should collaborate on responsible research and innovation	collaboration environment	strategic collaboration; successful cases; partnership building support; policies, regulations and cultures; knowledge, funding and innovation; mindset
	common challenges	education, healthcare and environment protection, etc.
	shared interests	shared interests and a basis for collaboration
	complementarity	technology and knowledge; innovation, creativity and markets; sustainability and responsible design; gender research
Task 2 (Q2): potential areas for UK-China creative industries RRI collaboration	creative industries	N/A
	technology, AI, ethics and cybersecurity	N/A
	healthcare	N/A
	sustainable development	N/A
	co-design and inclusivity	N/A
	education	N/A
	research collaborations	N/A
	knowledge exchange	N/A
common challenges	N/A	
Task 3 (Q1): how the UK and Chinese creative industries could collaborate on responsible research and innovation	collaborative environment	interest groups and consortiums; resources and opportunities; understanding
	research collaboration	effective ways to collaborate; industry-academia-research collaboration; IP; AI
Task 3 (Q2): challenges of the	Different regulations and policies	N/A

UK and Chinese creative industries RRI collaboration	Cultural differences	N/A
	Communication barriers	N/A
	Lack of understanding	N/A
	Limited resources and support	N/A
	Difficulties in research collaboration	N/A
Task 4: other comments or suggestions	AI	N/A
	Communication, knowledge sharing and networking opportunities	N/A
	Research centre	N/A
	Public awareness	N/A
	Funding	N/A
	Iterations	N/A

4. Workshop Findings

4.1 Participants’ industry and research interests and their relevance to RRI (Task 1)

Of all the groups, only the participants in Group 1 had a background in IT, software and computer services. However, the results of the workshop showed that the participants in all four groups had a strong interest in the theme of RRI and computer science and applications (see Appendix 1 - Raw data tab - Task 1_Q1). The thematic analysis shows that the participants were very interested in Artificial Intelligence (AI) and in areas related to AI. The most popular area was AI, which was mentioned 7 times, such as ‘AI-generated data’, ‘privacy-aware and trustworthy AI’, ‘smart design for connected systems with embedded AI+Data+ simulation models’ and ‘the impact of artificial intelligence on designers’ cognition and creativity’. The participants also expressed interest in ‘digital twin-based smart products’, ‘big data’, ‘machine learning’, ‘smart cities’ and ‘immersive technologies’ related to AI technologies. Some participants also mentioned ‘service and systems’, ‘technology application’, ‘gaming and gamification’, ‘technology-enhanced learning’ and ‘digital artifacts’.

The second and third popular themes were design and fashion. This was due to the fact that 10 participants had a background in design and designer fashion. In terms of design, the participants expressed interest in the following RRI-related topics: design for health and co-design. Under the fashion theme, they expressed their interests in sustainable fashion, textiles and health and fashion design innovation. The participants were also interested in music, culture, healthcare, ethics and some other themes (e.g., creativity and human behaviours).

The participants were asked to indicate the relevance of their industry and research interests to RRI. The results yielded ten themes: sustainable futures; healthcare; responsible technology; digital innovation; design methods; education; privacy, ethical and legal issues; social mobility; and value and impact. Among them, sustainable futures, healthcare, responsible technology and design methods were the most popular themes:

- **Sustainable futures:** This theme has two sub-themes, namely, environmental sustainability and sustainable development. Participants identified environmental protections, the role of design in net zero transitions, manufacturing (e.g., circular economy, product recycling) and travel as relevant to their industry and research interests.
- **Healthcare:** Under this theme, the participants were interested in ageing issues, health education and health and social care (including digital health). They did not explain why healthcare is relevant to RRI and creative industries. However, design for health and well-being and co-designing solutions with the community has been a hot topic in design research in recent years.
- **Responsible technology:** The participants mentioned several topics related to responsible AI, cyber security and privacy, and technology applications (e.g., smart living and cultural heritage protection).
- **Design methods:** Design strategy, problem solving, design for social innovation, co-design (including community development), user-centred design and inclusive design were considered relevant to RRI.

The participants also raised the themes of education; privacy, ethical and legal issues; digital innovation; social mobility; and value and impact as relevant to their industry and research interests.

4.2 Potential areas of and reasons for UK-China RRI collaboration in the creatives industries (Task 2)

4.2.1 Potential areas of collaboration

Eleven themes regarding potential areas of the UK and China RRI collaboration in the creative industries emerged from the workshop data, such as creative industries; technology, AI, ethics and cybersecurity; healthcare; and co-design and inclusivity (see Figure 4). Figure 5 shows the word cloud of the workshop data on potential areas for UK-China RRI collaboration in the creative industries (the platform used by the researchers to generate the word cloud is the Free Word Cloud Generator <https://www.freewordcloudgenerator.com/>).

applying persuasive technology to promote behaviour change + privacy concerns (app tracking)', 'using emerging tech in user experience' and 'digital heritage'. Healthcare was the second frequently mentioned area. Under this theme, the participants mentioned 'elderly care', 'ageing management', 'wellbeing' and 'young people's mental health issues and influencing factors as well as intervention strategies'. Sustainable development was also a popular area with participants, particularly environmental sustainability. Sustainable industrial solutions were highlighted, such as circular economy opportunities for fashion and textiles, digital software and new production processes for sustainable and environmentally friendly manufacturing.

The participants recommended university-industry research collaborations, joint research projects and workshops, and suggested that the two countries could explore joint responses and proposals to address the major challenges of the 21st century. It was noted that researchers from both countries could work together on co-design and inclusivity, such as 'user engagement in co-design process', 'community development' and 'inclusive design'. Education was also identified as a potential area for collaboration. Relevant topics included 'creative approaches for education' and 'education of garment' and 'students/ staff exchanges'. One participant suggested 'cross-cultural studies on user acceptance and trust of future mobility (automated shuttles, taxis) that will inform the design of the vehicles, regulations and services/systems'. There is also a recommendation for knowledge exchange between the two countries on skills and technology to increase productivity.

4.2.2 Reasons for UK-China RRI collaboration in the creative industries

The participants articulated the reasons why the UK and China need to collaborate on RRI from the perspectives of collaborative environment, common challenges, shared interests and complementarity.

In terms of the collaborative environment, the participants indicated that UK-China collaboration could bring about 'more strategic collaboration', 'really create the right level collaboration', 'support partnership across industry, policy and education' and maximise 'knowledge and funding' and 'foster new collaboration to innovate'. It was also mentioned that 'user acceptance of new technology can be influenced by the countries' policies, regulations and cultures'. All of this suggests that collaboration between the UK and China could create a better environment for RRI in both countries. In addition, one participant noted that 'creative industries are narrowly defined; some parts in China is called information industry'. In order to foster collaboration, the participants felt it was necessary to be open-minded about definitions and scopes.

With regard to common challenges, it was noted that the two countries could look beyond their differences to explore joint solutions to these challenges. It has been suggested that the two countries could work together in politically neutral areas such as education, health care and environmental challenges. In terms of shared interests, one participant pointed out that both countries offer support to the creative industries.

In addition, the participants noted that the UK and China are complementary in many areas, such as technology and knowledge; innovation, creativity and markets; sustainability and responsible design; and gender research. In terms of RRI and technology and knowledge, one participant from the music background gave an example: 'Both countries are facing the same issues of how to use AI to promote the preservation of music culture and sound design for environmental protection, but with different cross-cultural perspectives that can be mutually reinforcing and inspiring'. With regard to sustainable development and responsible design, one participant

indicated that his or her students had a lower level of awareness of sustainable development and responsible design than students in the UK. The participant suggested comparing the differences in the level of acceptance of sustainable development and responsible design among students in the two countries to see what insights could be gained to help China integrate sustainable development in education. Moreover, one participant commented that ‘gender roles and expectations are different in the UK and China that might impact their decision-making in product purchase, choosing travel modes etc’. RRI is about research and innovation for and with society and making ethical, inclusive, accessible and sustainable products for everyone. The UK and China could collaborate on exploring topics on genders and new product and service development.

4.3 How the UK and Chinese creative industries collaborate on RRI and the challenges involved (Task 3)

4.3.1 Fostering RRI collaboration between the UK and China in the creative industries

The workshop raised two themes on how the creative industries in the UK and China can collaborate on RRI: collaborative environment and research collaborations.

The workshop data highlight the importance of creating a collaborative environment. Participants recommended the formation of interest groups and consortiums to facilitate collaboration and noted the importance of better understanding each other, including cultural differences, communication styles, goals and expectations. Participants emphasised that resources and opportunities are the key factors for collaboration. Access to resources is crucial for collaboration and can be achieved through funding schemes, information (e.g., contact lists with expertise) and database sharing. There is also a need to create opportunities to foster collaboration, such as seminars, conferences, workshops, guest lectures, exhibitions, staff and student exchange programmes, and academic and industrial exchange activities.

With regard to the research collaboration, the participants noted the need to identify effective ways to collaborate: ‘share idea and share the responsibility of projects’, ‘find the right collaborative way to work on the same goal, clarify the project in the beginning step’ and ‘identifying ways to work together, joint funding, defining common guidance and recommendations, creating case studies and model showcases’. Other topics on how the UK and China can collaborate on research projects include: industry-academia-research collaboration, creating intellectual property (IP) and clarifying ownership of IP, AI applications and AI inclusive design.

4.3.2 Challenges of RRI collaboration between the creative industries in China and the UK

In terms of challenges, several themes were identified at the workshop: different regulations and policies, cultural differences, communication barriers, lack of understanding, poor collaboration environment, and difficulties in research collaboration.

- **Different regulations and policies:** This was the most frequently mentioned challenges. The UK and China have different regulations and policies (e.g., data protection, privacy and confidentiality, and technology export controls), which create difficulties for contract signing and research collaboration.
- **Cultural differences:** Cultural differences were mentioned seven times. The participants highlighted differences in cultural understanding, cross-cultural perspectives,

interpersonal relationships, work habits (e.g., the use of synergistic operating tools), time management, and preferences of top-down or bottom-up approaches.

- **Communication barriers:** Lack of effective communication mechanisms, time differences and language barriers make communication difficult.
- **Lack of understanding:** One participant noted that ‘A lack of experience in working with people in China that could lead to uncertainty about processes and potential outcome and hesitance to approach as well as to promote collaborations’. The solution is to develop ‘a better understanding of each other, considering cultural differences, communication styles, goals, expectations, etc’.
- **Limited resources and support:** Some participants reported the following challenges: ‘to find the right collaboration partner’, ‘limited networking platforms’, ‘resource access’, and ‘time out from other commitments - funding and support creates opportunities’. One participant highlighted the importance of ‘building a better collaboration environment, including funding schemes, seminars, and conferences’.
- **Difficulties in research collaboration:** The participants mentioned a number of difficulties in research collaboration: ‘different goals and timeline’, ‘how to share the same vision and goal and distribute responsibilities’, ‘lack of ownership’, ‘different measures of outcomes’, ‘economic impact vs social impact’, ‘applications in practices’ and ‘clarity on IP issues’ (or ‘copyright attribution’).

4.4 Other comments and suggestions on the China-UK creative industries RRI collaboration (Task 4)

The participants made a number of comments and suggestions before leaving the workshop. One participant noted that AI-generated content is both a challenge and an opportunity for China and the UK to collaborate on the creative industries, and that the two countries should work together to explore more, which will require interdisciplinary efforts, with trustworthy and responsible AI being at the centre of this topic. They also emphasised their need for communication, knowledge sharing and networking; suggested that physical research centres be put into place and that practices be digitised and made available to the public; and expressed a desire for more funding collaborations. As one participant put it, ‘Based on the content of the discussion, it is possible to gradually increase and refine the content that can be collaborated on, and to achieve (outcomes) faster’.

5. Discussion

Both the UK and China governments have developed strategic policies and invested heavily in the creative industries and responsible innovation as highlighted in Section 2. However, Section 4 highlights that stakeholders face challenges engaging with these policies and initiatives within their own country. This is likely due to the strategic nature of the policies and the lack of practical operational guidance or examples for creative industry stakeholders to follow. For example, the development of design prompt cards for RRI (Portillo *et al.*, 2023) are one of the few examples of concrete guidance for actioning RRI strategy, but these cards are targeted at academic research design rather than the creative industries. The lack of concrete guidance and examples of RRI for the creative industries within the UK and China compounds the challenges of responsible collaboration between the two countries. In other words, participants in the UK and China were interested in RRI but had difficulties finding ways to undertake it in their sector.

Developing more operational guidance on RRI in the creative industries within a country would help to frame and inform collaboration between the countries.

The main difficulties for supporting RRI between the creative industries of China and the UK were reported by participants as being regulation and policies, cultural differences, and communication barriers. These are deep-rooted geopolitical and societal differences which are unlikely to be resolved in any meaningful way such as harmonising regulation of RRI between the UK and China. For example, there are notable differences in how China and the UK understand and define RRI given the origins of responsible innovation thinking in Western discourse and the substantive framing of RRI regulations and policies by government initiatives (Li *et al.*, 2023). A pragmatic and culturally sensitive approach would be to develop a UK-China hub which supported the navigation of these regulatory differences and collaboration challenges whilst being open-minded about definitions and the scope of RRI.

The findings from the workshop highlight the importance of computer science, design and fashion in RRI for the creative industries. However, these priority areas are likely biased by the sample group for the workshop who were predominantly in the major creative industry sectors of design and designer fashion (10), and IT (3). Though it is worth noting that participants identified RRI themes which were not tied to these priority areas and reflect RRI more broadly: sustainable futures, healthcare, responsible technology and design methods. For example, design for health and wellbeing is a hot topic in design research, which may be why healthcare was mentioned. Moreover, these themes re-appeared in the participants' desires for potential areas for UK China RRI collaboration. Further research is needed to engage with a wider cross-section of the creative industries, for example, Advertising (1), Architecture, Crafts, Film, TV, radio and photography, Museums, galleries and libraries (2), Music, performing and visual arts (2), and Publishing. A UK-China creative industries hub could play a role in broadening the conversation and discourse around RRI to these other sectors.

The prominence of concerns about AI in the participants' responses about RRI is notable and overshadows other RRI concerns such as 'economic, social, and environmental' impact (EPSRC, 2024). The emphasis on AI may be a product of participants from IT creative industries sectors, or may be a result of current public and academic discourse and concern about AI in the creative industries (Lee, 2022; Whiting, 2024). Either way it would be worth exploring the perception of AI in RRI in China and the UK, for example, exploring themes of Responsible AI (DSIT) as well as targeting research questions on core RRI topics which may not be as prominent in general discourse at this moment.

To encourage collaboration and move discourse on RRI forward in the UK and Chinese creative industries there needs to be greater practical support for undertaking responsible collaboration projects between the UK and China. In particular, sharing guidance on RRI regulation within and between the UK and China, facilitating finding partners in creative industries of both countries, offering concrete guidance and examples of managing IP and responsible innovation between countries. Concrete examples of RRI within and between the UK and China would help to signpost and scaffold future RRI collaborations. Developing toolkits for RRI in and between the creative industries of the UK and China such as RRI design cards would pragmatically help stakeholders to scaffold their responsible innovation. Establishing a UK-China hub to support these activities requires sustained funding and support. A concrete return on investment for such a hub would be the responsible commercialisation and access to markets from both a consumer and governmental understanding of RRI.

Moreover, UK-China RRI collaboration in the creative industries could benefit from both top-down and bottom-up approaches. Top-down approaches support collaborative research to address specific and major societal challenges and are therefore more politically driven (Porta, 2020). As discussed in Section 2, both the UK and Chinese governments are ambitious and committed to supporting and promoting RRI, and have made the development of cultural and creative industries a priority in their national industrial development strategies (BEIS, 2017; Liang and Wang, 2020; The State Council, 2021; DCMS, 2023a). Making RRI cooperation in the creative industries a national strategy and a way of deepening UK-China cooperation is in the bilateral interest and will benefit both governments and industries. A top-down approach to allocating funds, setting policy and creating frameworks for RRI in the creative industries can be used by both the UK and Chinese governments to deliver on a range of shared priorities for both governments, such as:

- promoting the application of new technologies and digitalisation to take advantage of technological opportunities arising from the Fourth Industrial Revolution;
- deepening UK-China cooperation on creative industries focuses on maximising the positive social, environmental and economic impacts of creative industries;
- establishing UK-China RRI networks of industry and academia to tackle major social, environmental and economic challenges together and build a community of shared responsibility for the future.

Successful UK-China RRI collaboration in the creative industries also requires bottom-up approaches. Bottom-up and industry-oriented funding (e.g., the UK's Knowledge Transfer Partnership Grants and Innovate UK Smart Grants) is essential to support both individual researcher-led curiosity-driven RRI projects and company-led value-driven RRI projects (Porta, 2020). Industry associations, trade bodies, non-profit organisations and industry-government forums can play an important role in promoting and supporting bottom-up university-industry RRI cooperation in the creative industries. For example, the UK Creative Industries Council is a forum for the UK government, creative businesses and other creative organisations. It supports UK-China cooperation in the creative industries in a number of ways, including helping UK companies enter the Chinese market and sharing successful examples of UK-China collaboration (CIC, 2024). A similar example in China is the China National Textile and Apparel Council. The future UK-China Creative Industries R&I Hub can support bottom-up RRI-related activities by engaging stakeholders from government, industry, academia and non-profit organisations in both countries, and providing a platform and resources to foster collaboration.

6. Conclusions

Over the past decade, there have been many successful collaborations between the UK and Chinese creative industries through government-funded research projects. In today's competitive global business environment, the development of the creative industries and collaboration between the two countries is becoming increasingly important and valuable in consolidating the position of the UK and China as cultural and trade powerhouses. The economic and social value of the creative industries and the major global challenges associated with them, such as climate change and AI governance, are widely recognised by researchers. In this context, the application of RRI is critical to the sustainable development of the creative industries in both the UK and China and should therefore be a key priority for UK-China creative industries cooperation.

However, RRI is a new concept for the creative industries in both countries and has not yet received sufficient attention.

This research is a first step in understanding the opportunities and challenges for UK-China RRI collaboration in the creative industries. It identifies significant stakeholder interest in UK-China RRI collaboration in the creative industries, as well as related emerging research and innovation trends, potential areas for collaboration and challenges. RRI themes such as a sustainable future, healthcare, responsible technologies (e.g., AI) and design methods were identified as hot research topics, while regulation and policy, cultural differences and communication barriers were identified as major difficulties for such collaborations. Recommendations for creating a collaborative environment are considered useful to facilitate relevant collaborations, including the formation of interest groups and consortiums, building better mutual understanding, and providing access to resources and information. Practical guidance or relevant examples of collaboration need to be developed to facilitate effective RRI collaboration. In addition, we believe that the creation of top-down and bottom-up approaches to promoting UK-China RRI collaboration in the creative industries is critical to its success. Specific suggestions have been made accordingly.

The main limitation of this study is the lack of adequate representation of the workshop sample group. There is therefore a need for further research. One possible future research direction is to conduct large-scale research involving academia and companies from all creative industries in both countries, as well as other types of relevant stakeholders such as industry associations and governments. Commercialisation and market access should also be considered a key issue for RRI, as the economic value of RRI is often neglected. The future UK-China Creative Industries R&I Hub can provide a platform to enable and promote RRI collaboration by contributing to the design and implementation of top-down and bottom-up approaches. It should not be impossible to develop a set of RRI guidelines, best practices and design tools for the creative industries. This would benefit both countries and all key stakeholders.

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