

# Reflecting on Challenges and Opportunities: Examining the Colour Economy of Innovation and Entrepreneurship

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**Abstract.** Nearly a quarter of a century has passed, and current socio-economic and cultural conditions necessitate new approaches to conceptualizing Economics. The framework of Colour Economics offers an opportunity to transcend paradigms. In contrast to prevailing economic thought, a vibrant spectrum of colours emerges. Through an in-depth analysis of the 15th RIDIT Conference proceedings, this study explores how various chromatic dimensions— from green, symbolizing environmental consciousness, to orange, representing creativity, yellow, denoting technological efficiency, and purple, associated with social inclusion—interact and occasionally conflict, providing a novel interpretation of development.

Our post-proceedings analysis reveals that economies of colour are not isolated but instead blend and adapt in contexts of resource scarcity and innovation. Three notable patterns emerge: informal sectors naturally create complex combinations of these economic hues, geographic and cultural contexts significantly influence how these colours interact, and undergo transformations as they flow across distinct economic domains.

These findings challenge traditional theoretical frameworks. Economies of colour must be understood in a fluid manner, particularly in developing communities, where necessity fosters innovation and entrepreneurship. The implications are far-reaching, influencing public policy and institutional structures, thus urging a reconsideration of how to foster and study innovation in an increasingly diverse economic landscape.

## 1 Introduction

The first quarter of the 21st century is a mosaic of transformations. The world has undergone abysmal and dramatic changes characterised by the emergence of new hegemonies and new economic paradigms that challenge the traditional Western order and primacy. This evolution has complex and varied features marked by globalisation. As Hossain [1] and Rodrigues [2] document, China and India challenge Western historical dominance, creating a multipolar scenario. According to Mukhopadhyay [3], the Muslim world grows in economic and geopolitical influence while Latin America resurges with its identity and particular challenges. Pande [4] highlights how inequality and fragmentation can limit Africa's potential, while demographic changes - population ageing in developed nations and rapid growth in regions such as Africa and Asia - present both opportunities and risks. Rubaj [5] highlights how these differences affect demand for goods and services, as countries with ageing populations face higher healthcare and pension costs, while economies with young populations drive sectors like education, technology, and employment. This double demographic pattern challenges meeting specific

population segment demands while presenting new business and industrial transformation opportunities.

Digital transformation and sustainability emerge as two main drivers of this global change. González Rubio et al. [6] demonstrate how both concepts have revolutionised contemporary production and trade patterns. As documented in 'Innovation and technology in urban transformation' [6] and supported by Chupanova et al. [7], digitalisation has enabled more efficient and personalised production and the expansion of e-commerce and digital services, which have facilitated the creation of more agile global supply chains. As León-Pozo and Mellink-Méndez [8, 9] observe, adopting Industry 4.0 technologies like IoT, AI, and Big Data has enabled greater efficiency and cost reduction in industrial production.

International trade, while still expanding, is experiencing a significant shift towards endogenous development in some economies. The rise in geopolitical tensions and lessons from the COVID-19 pandemic has led many nations to prioritise local or regional production to ensure greater self-sufficiency. This local production coexists with global interdependence, but stronger national economies are emphasised against global

chain vulnerability. Some countries' policies reflect a retreat towards protectionism, with strategies to protect local industries and reduce dependence on international actors. Protectionism and economic nationalism are causing an increase in trade barriers.

The cultural landscape witnesses a globalisation trend bringing digitalisation and immediacy culture and exacerbating individualism, pluralism, and diversity. Hernández-Chavarría et al. [10] identify growing environmental concerns and increased digital activism, framed within the emergence of movements like cancel culture and identity political activism. Socially, these changes manifest as a constant tension between consumerism and environmental awareness, alongside new pluralism dynamics questioning previous generations' values. These cultural shifts align with what Buheji and Ahmed [11] describe as a response to pandemic-era transformations, bringing digitalisation, immediacy culture, and heightened environmental awareness.

The economic crises of the 21st century have challenged traditional economic theories. Thus, the emergence of economists like Thomas Friedman, Thomas Piketty, and Joseph Stiglitz has brought new approaches to globalisation and inequality. Economists like Angus Deaton, Abhijit Banerjee, Esther Duflo, and Michael Kremer have emphasised the importance of addressing poverty and economic development from local and inclusive perspectives. Amartya Sen has taken a more humanistic approach, emphasising the importance of human capabilities and well-being over mere economic growth. In contrast, recent Nobel laureates Daron Acemoglu and James A. Robinson have underscored the cardinal role of institutions in economic development, leading to the questioning of neoclassical models that do not consider the socio-political realities of countries. William Nordhaus and Paul Romer have addressed sustainability and innovation in environmental economics and endogenous growth.

In turn, Mariana Mazzucato and Carlota Perez polemicise with orthodox growth views and disseminate an alternative model that considers public investment, innovation and capacity-building triggers for more equitable and resilient development. These economists represent what Carpentier and Rang [12] identify as a reaction against neoclassical economics, challenging traditional assumptions about rationality and the state's role in economic development. By questioning assumptions of absolute rationality and the passive role of the state, these currents reflect a new vision that integrates social, political, and

cultural aspects and uses economics to solve complex problems of inequality, sustainability, and governance.

Within this context, the emergence of colour economies has become more than just a theoretical framework - it represents a practical response to contemporary challenges [13, 14]. This study examines how different "colour economies" - green, yellow, purple, orange, and grey - manifest unique patterns of innovation and entrepreneurship while sharing certain fundamental characteristics. By examining economies of different colours, we can identify unique attributes that characterise innovation in each colour shade and how innovation and entrepreneurship manifest. Thus, the palette of colours leads us to a better and deeper understanding of contemporary patterns of economic development as well as unique characteristics and potential obstacles to driving innovation and entrepreneurship.



**Figure 1.** The Economy of Colours: A network visualisation.

A visualisation of the dynamic network of the 'Economy of Colours'. The nodes symbolise the main themes of each colour: green (environmental sustainability), orange (creative and cultural industries), yellow (technological innovation), purple (equity and social inclusion) and grey (the informal economy, represented here in a situation of transition and integration). The connectors represent the strength and type of relationships between the different colours, while the mixture of colours demonstrates the interconnection. The prominence of purple emphasises its importance as a fundamental element in holistic development. Image created by Midjourney AI.

The XV National Conference of the Research Network on Teaching and Technological Innovation (RIDIT), held at CETYS University in Ensenada, Mexico, was a critical platform for advancing these discussions. This paper goes through the contributions presented at the Conference, exploring how economies of colour manifest themselves in various theoretical and empirical contexts to develop insights into their potential to address global and local challenges. By integrating findings from RIDIT with contemporary literature, the study aims to deepen understanding of these emerging economic paradigms and their implications for innovation, policy, and practice.

This essay is structured in four main sections following this introduction. First, we analyse the emergence of colour economy paradigms and their theoretical foundations, examining how each colour represents distinct but interconnected economic approaches. The second section presents our research methodology and empirical findings from 14 selected papers at the XV National Conference of the Research Network on Teaching and Technological Innovation (RIDIT), held at CETYS University in Ensenada, Mexico. The third section developed a comparative analysis of patterns of innovation and entrepreneurship in different economies of colour, cross-examining their particular characteristics and shared attributes. It then discusses implications for the policy and practice of innovation and entrepreneurship in the colour economy, suggesting future lines of research and recommendations for stakeholders. Throughout the analysis, we integrate findings from contemporary empirical research with theoretical insights from the evolving literature on colour economies while acknowledging certain limitations in our current understanding of these emerging economic paradigms. Some aspects of the interaction between different colour economies remain to be fully explored, particularly regarding quantitative metrics for measuring cross-colour impacts and long-term sustainability outcomes.

## **2 Methodological Framework**

Our examination of economies of colour in Latin American innovation and entrepreneurship focuses on papers presented at the XV National Conference of the Research and Teaching Network on Technological Innovation. This 25-year-old scientific society brings together social sciences

and engineering scholars from across Mexico, with nodes in Argentina, Cuba, Costa Rica, Colombia, Ecuador, Spain and the United States. CETYS University, located in Ensenada, Baja California, Mexico, hosted this Conference. Its call encourages scholars to generate a structured view of the multicolour economy in Latin American contexts.

### **2.1 Data Collection**

The Conference's rigorous submission process began with researchers submitting 500-word abstracts addressing specific aspects of colour economies. The scientific committee, comprising 52 scholars from leading institutions across Latin America and Spain, evaluated these submissions based on their theoretical contribution, methodological rigour and relevance to understanding regional economic transformation. From 99 initial abstracts, 67 papers were developed into full manuscripts following detailed academic rigour and presentation guidelines.

Through careful deliberation, members of the Scientific Committee, who were also part of the General and Local Organising Committee, identified 14 papers that illustrated how different economic frameworks manifest themselves in regional innovation and entrepreneurship. The authors were invited to submit an improved version of their paper for re-evaluation in a double-masked assessment. With the approved versions, the present post-proceedings were constituted.

### **2.2 Data analysis**

This post-proceeding analysis focuses on these 14 articles that exemplify distinctive approaches to innovation in economies of different colours. As editors, our criteria focused on evaluating theoretical frameworks, empirical evidence, and the contribution to understanding regional economic development. Our analysis examines specific innovation cases while following broader academic trends through the bibliometric analysis presented in the first chapter of this publication.

The distribution of our selection reflects both the Conference's thematic emphases and the strength of the presentations in different areas: three articles examine the green, yellow, and purple economies, four articles explore orange economy initiatives, and one article investigates the dynamics of the grey economy.

The papers on the green economy documented environmental initiatives that transcended mere conservation, creating new forms of social value. In Durango, for example, ecotourism projects

demonstrated how environmental protection could generate economic opportunities for indigenous communities. For its part, Sinaloa's agricultural sector, in terms of sustainability initiatives, fostered significant social innovation.

Technological transformation dominated the presentation of the yellow economy, especially in the urban centres of northern Mexico. These documents revealed how digital innovation is reshaping traditional industries, often in a way that is 'endemic' to regional contexts, providing evidence of the dynamics of sectoral and regional innovation systems.

Works on the purple economy demonstrated that social inclusion triggers innovation. Paradigmatic of this situation is the paper about trans entrepreneurs in Tijuana and the women-led businesses in Durango.

The creative industries attracted significant attention at our Conference, with articles exploring various aspects of the orange economy. Our selection reflects that diversity, from comic book production to museum innovation. In the regional development realm, these studies demonstrated the vital role of culture.

Although the few contributions on other colours were less numerous, we chose the one on the grey economy, as it provides crucial information on how innovations in the informal sector often pioneer solutions that, later, formal institutions may adopt

Our analysis takes a closing reading of the selected papers as its point of departure. We identify thematic patterns and trace how different colour economies intersect along the diverse papers: environmental initiatives that incorporate principles of social inclusion, cultural projects that leverage digital technologies, and informal innovations influencing practices in the formal sector.

The editors' deep knowledge of regional economic dynamics and the economy of innovation has been our guidelight for analysing the papers. Instead of employing coding schemes, the experience-based approach enabled a nuanced understanding of how theoretical frameworks translate into practical implementation across different contexts. The editors focused on how innovations emerge and evolve within specific regional settings.

### **2.3 Limitations**

We acknowledge several constraints in our approach. The selection of papers, while informed by expert judgment, cannot comprehensively

capture the colour economies in practice. Our focus on academic papers may underrepresent informal sector innovations and grassroots-related economic ongoing changes. Additionally, the regional concentration, though enabling deep insight into Latin American contexts, may limit broader generalisation.

Despite these limitations, our methodology yields valuable insights into how colour economies manifest in practice. Through our expert-guided analysis, patterns of integration between different economic approaches have been uncovered, and highlights of the crucial role of regional context in shaping economic transformation have been revealed. These findings suggest promising directions for both theoretical development and practical implementation, particularly in understanding how different economic frameworks can combine to address complex challenges.

The analysis points toward several promising research trajectories. We need a better understanding of how innovations spread between formal and informal sectors, more sophisticated approaches to evaluating policy effectiveness, and deeper insight into how regional contexts shape economic transformation. These challenges invite continued investigation into how economic transformation unfolds in specific settings.

## **3 Beyond Traditional Economics: The Rainbow Revolution**

The colour economy framework emerged initially as a metaphorical way to understand different economic activities but has evolved into a sophisticated analytical tool [13]. This evolution responds to contemporary challenges of capitalism, globalisation, technical change, sustainability, health, and equity [15, 16]. Traditional economic modelling starts by segmenting economic activities into isolated silos, which is inadequate for dealing with multifaceted phenomena. Thus, studying such phenomena requires an integrated approach, as in colour economics, where tonalities spontaneously overlap and complement each other [17].

The systematic organisation through colour-coding reflects distinct but interconnected economic approaches. The blue economy concept pioneered by Pauli [18] focused on marine and aquatic resources, later expanding to address broader maritime sustainability challenges in regional contexts like CARICOM [19]. Parallel developments saw the emergence of the green economy addressing environmental sustainability through innovative market mechanisms. Each

shade represents unique aspects of economic transformation – the yellow economy expresses technological efficiency, the orange economy aligns with creative industries' potential, the silver economy addresses demographic challenges, and the purple economy emphasises social inclusion [20, 21]. Finally, the shadow economy - which encompasses those economic activities that are neither strictly controlled nor reported to the authorities - represents all those transactions of an informal nature that contribute to the world's Gross Domestic Product [22].

### 3.1 Institutional Recognition and Policy Integration

The framework's widespread adoption by major international organisations evidences its legitimacy. The United Nations and World Bank embraced green economy principles, while the Inter-American Development Bank pioneered orange economy initiatives [17, 20]. Maritime nations integrated blue economy thinking into development strategies, and European countries incorporated silver economy considerations into social policies responding to demographic shifts [18, 21].

### 3.2 Market Response and Sectoral Transformation

Private sector engagement marks a significant shift in business thinking. Enterprises increasingly adopt integrated approaches combining technological

efficiency with environmental sustainability [6]. Creative and cultural industries demonstrate particular dynamism in embracing orange economy approaches, especially in emerging markets [23]. This transformation in business mindset scopes beyond individual colours, revealing new paradigms for value creation and sustainability development.

### 3.3 Academic and research development

Research interest in economies of colour has grown exponentially, particularly in 2017-2022. Our bibliometric analysis reveals striking growth patterns: publications on green economy - focused on sustainable development and environmental conservation, promoting practices that minimise environmental impact and encourage efficient use of natural resources - increased from 339 in 2017 to 973 in 2022, representing a growth of 187%. The yellow economy, focused on technology-intensive production, integrating social and environmental aspects, digital entrepreneurship and startups, demonstrated an even more dramatic expansion with 260% growth, reflecting the increasing importance of digitalisation in the global economy. The orange economies focused on creating and using intellectual property to generate economic and social value, and the purple economies focused on social inclusion, cultural diversity, and community cooperation, maintaining steady growth and doubling their academic output.

**Table 1.** Evolution of Research on Colour-Coded Economies: A Scopus Research Analysis (2017-2022).

Economy	Search Terms	Primary Areas	Primary Focus	Research Trends	Conceptual Development	Publications (2017)	Publications (2022)	Growth %
Green	"green economy" + (innovation OR entrepreneur)	Business, Environmental Science	Environmental sustainability and economic development	Increasing integration with social innovation	Well-established with solid theoretical frameworks	3399	7318	117%
Orange	"Orange Economy" OR "cultural industr" OR "creative economy" + (innovation OR entrepreneur)	Business	Cultural and creative industries	Emphasis on intellectual property and cultural value	Emerging with clear definitions	4589	998	-78%

Economy	Search Terms	Primary Areas	Primary Focus	Research Trends	Conceptual Development	Publications (2017)	Publications (2022)	Growth %
Purple	"purple econom" OR "social econom" OR "solidarity econom" + (innovation AND entrepreneur)	Business, Economics	Social and solidarity economy	Focus on social impact and cooperation	Under development with mixed theoretical basis	2856	100	-96%
Yellow	"yellow econom" OR "start-up econom" OR "digital econom" + (innovation OR entrepreneur)	Business	Digital entrepreneurship and startups	High focus on technological innovation	Rapid conceptual growth	5218	7260	39%
Grey	"grey econom" OR "informal econom" + (innovation OR entrepreneur)	Economics	Informal economic activities	Limited academic research	Fragmented conceptualization	3142	35	-98%

**Note:** Data extracted from the Scopus database in January 2023 using the search terms specified in the table. The "Growth %" column represents the percentage change in publications from 2017 to 2022. The colour-coding is used to visually represent distinct economic concepts and their associated research areas. This Table is complementary of the search reported on the Paper: Estrada, S., Montalván-Burbano, N., Cabrera-Flores, M.R., León-Pozo, A., & Rueda-Prieto, J.A. (2024). Innovation and entrepreneurship: A colour economy glance. In S. Estrada, M. Cabrera-Flores, A. León-Pozo, & C. Cota-Cota (Eds.), 15th CONRIDIT ENSENADA 2023 - 15th Conference of the Ridit "Innovation and Entrepreneurship in the Colour Economy", Post-proceedings SHS Web of Conferences.

Most research concentrates on the intersection between innovation and sustainability. Zhang et al. [24] document how green innovation extends beyond environmental protection to encompass social and economic dimensions. With varying emphasis and diverse applications, this trend appears consistently in the various shades of the colour economy. It is worth noting that regional variations stand out in colour economics research. Thus, Asian researchers lead in the number of publications, while European institutions dominate concerning the development of theoretical frameworks. Though fewer, Latin American contributions show particular strength in orange and purple economy applications [23].

### 3. 4 Integration Patterns and Synergies

The most compelling developments emerge at the intersections between different colour economies. As Carpentier and Rang [12] observe, these intersections generate unique innovation and value-creation opportunities. Blue and green economies naturally converge around sustainability objectives. Yellow and orange economies share digital transformation imperatives. Purple economy imperatives,

emphasising social inclusion and cultural diversity, increasingly influence all other colours. Some convergences prove particularly potent. Consider combining creative industries with environmental sustainability or technological efficiency with social inclusion. These combinations generate what Chaves Ávila and Monzón Campos [25] term "hybrid value propositions" - solutions addressing multiple challenges simultaneously.

Cross-pollination between different colour economies accelerates innovation. Knowledge transfer occurs not just within sectors but across the entire spectrum of economic activity. This phenomenon manifests most clearly in urban contexts, where multiple colour economies interact and overlap.

### 3.5 Implementation Challenges and New Horizons

Every economic transformation faces resistance, and colour economies prove no exception. Regulatory frameworks often lag behind innovative practices, particularly at the intersections between different colour domains. Financial institutions struggle to evaluate and support initiatives that span multiple

colour economies. As Eynaud et al. [26] observe, traditional metrics prove inadequate for capturing value creation across this new spectrum of economic activity.

Resource allocation poses complex challenges when initiatives cross traditional boundaries. For instance, a project combining creative industries with environmental sustainability might fall between conventional funding categories. Funding is one area facing these difficulties; some projects measure holistic impact and thus move parallel to assessing technological efficiency, societal inclusion and environmental protection. The issue of cultural adaptation presents a considerable challenge since organisations are used to operating in one sector and must learn to adapt to situations in multiple areas. This adaptation requires new competencies, different mindsets, and reformed organisational structures. The transformation proves especially demanding for established institutions with deeply embedded practices and cultures.

### **3.6 Emerging Opportunities and Strategic Responses**

Digital transformation creates unprecedented possibilities for integration between colour economies. Technology platforms enable collaboration across previously separate domains. Artificial intelligence and data analytics offer new tools for measuring and optimising impact. The pandemic accelerated this digital transformation, pushing organisations to explore more flexible and integrated approaches [11].

New funding mechanisms emerge to support the economy of colour initiatives. Impact investing expands to encompass multiple dimensions of value creation. For example, blockchain technology enables new collaboration and value-sharing forms, helping bridge traditional gaps between economic domains.

### **3.7 Strategic implications and future directions**

New policies frequently recognise the need for integrated approaches to foster innovation and entrepreneurship. Even single-sector regulations are giving way to more flexible frameworks open to cross-sector initiatives. Public-private partnerships evolve to support projects that span multiple economies of colour.

Knowledge transfer mechanisms adapt to facilitate learning across domains. Universities develop interdisciplinary programs. Research institutions create platforms for cross-sector

collaboration. Professional networks expand to connect practitioners from different colour economies.

As Márquez and Restrepo [20] suggest, the future belongs to organisations capable of simultaneously working across multiple colour domains. That requires new competencies, different organisational structures, and reformed measurement systems. Forward-thinking institutions are already moving to develop these capabilities.

## **4 Patterns from the Postproceedings Analysis**

The XV National Congress of RIDIT revealed compelling patterns in how colour economies manifest across different contexts. Of the 99 proposals submitted, 14 selected papers demonstrate distinct yet interconnected approaches to innovation and entrepreneurship. The green economy papers, particularly the analysis of ecotourism in Durango, show how environmental initiatives create spillover effects in rural communities, generating employment and strengthening environmental conservation culture [27].

In the relationship between innovation and sustainability, the Carrillo et al. [28] paper reviews trends in eco-innovation. This kind of innovation is recognised as a driver for the development of clean technologies and sustainable practices, and it highlights the intersectoral collaboration between governments, companies, and non-governmental organisations to promote policies that encourage sustainability [28]. It also suggests that companies should integrate sustainability into their business models and that educational institutions should train leaders in this field. At the same time, active societal participation is crucial for driving significant change towards a greener economy [28].

Another contribution to the green economy is shown in the fertiliser and pesticide certification document, which shows that promoting sustainable agricultural practices minimises environmental impact and improves resource use efficiency. In these practices, there is room for innovation, the development of clean technologies, and the establishment of sustainable business models. Collaboration between government, business and NGOs is essential to create an enabling environment for these practices, ultimately leading to a more sustainable future [29].

Yellow economy contributions, notably González Rubio et al.'s [6] work on smart cities and López Hernández, Serrano-Santoyo, and Salazar analysis of AI implementation, demonstrate how technological efficiency drives transformation across multiple

sectors. These papers reveal a crucial pattern: Successful technological innovation requires careful attention to infrastructural and social dimensions.

The paper "Navigating the New Normal: Digital Proximity and JIT in Small Business Transformation." is representative of the yellow economy. It proposes innovative strategies for small and medium-sized enterprises (SMEs) to adapt and thrive in a digital environment. It notes the importance of digital proximity and stakeholder collaboration. It highlights the need for incentives to support research and development, preparing students for technological entrepreneurship, and the importance of developing or adopting sustainable practices to improve community well-being [31].

The section devoted to the purple economy compromises rich insights into the dynamics of inclusion. Research on trans entrepreneurship in Tijuana illustrates how marginalised communities leverage entrepreneurship for economic integration [32]. These insights can be directly connected to the outcomes of women-led businesses in Durango [10], suggesting common patterns in how entrepreneurship enables social transformation.

Also, in the purple economy section, a notable case study is dedicated to urban art in two Latin American cities: Bucaramanga (Colombia) and Ensenada (Mexico). It illustrates the community's commitment to promoting diversity and inclusion by creating collaborative business models. Initiatives such as the Tres Perros collective and La Colectiva Maremoto exemplify how art can address social problems and enhance local identity while encouraging stakeholders such as governments, businesses, and educational institutions to support these transformative projects [9].

The essence of the orange economy is illustrated by the chapters that emphasise the cultural and creative value of various products, such as comics, gastronomy or heritage. These activities are important contributors to economic and social development. They reveal the importance of knowledge exchange and collaboration among creators where networks are configured to feed innovations [33]. They also describe how cultural and creative industries (CCI) can boost local economic growth and improve the quality of life, making public policies to support these sectors essential [8]. The chapters also reflect decentralised production and distribution models, the characteristics of the Orange Economy, and diverse creative activities.

The article by Rocha Ibarra et al. [34] suggests that, besides attracting tourism, historical museums promote local culture and generate significant regional income. Innovative practices such as using digital platforms in cultural promotion, which can open up opportunities for cultural entrepreneurship, are

noteworthy. A favourable environment for innovation and cultural entrepreneurship should consider government policies to promote intellectual property, collaborative activities between companies and cultural institutions, and educational programs that empower society to develop relevant skills and actively participate in cultural demand and content creation.

From other economies of colour, we have chosen the grey economy contribution of Rivera et al. [35]. The grey economy, characterised by unregulated and informal economic activities, plays a complex role in fostering innovation and entrepreneurship. Informally operating a business allows greater flexibility to experiment and develop innovative business models in an environment with lower entry barriers [22]. Even if informality has to be addressed or undermined, the environment is conducive to developing and adopting creative solutions [36]. There are real risks in going after them, like legal consequences and insufficient help from formal systems. Ultimately, in the grey economy, people are free to try new ideas, even if they hurt the economy or the government. This experimentation could help with business and innovation.

The paper by Rivera-Huerta et al. [35] examines the convoluted dynamics of the grey economy in order to show its ability to drive innovation and entrepreneurship. It is characterised by lower entry barriers and flexibility, which gives rise to creative business models. They do not skimp on their significant challenges, especially regarding legality and sustainability. Central to their argument is the importance of educational programs and personalised support for informal entrepreneurs, which they see as key steps towards integrating these activities into the formal economic framework. The challenge for public policy is to recognise the positive contributions of the grey economy.

#### **4.1 Cross-cutting Innovation Dynamics**

Analysis of the post-proceedings reveals three dominant innovation patterns across colour economies:

Multiple papers strongly emphasise the convergence between technological and social innovation. León-Pozo and Mellink-Méndez's [8, 9] research on cultural industries in Tijuana-Ensenada demonstrates how creative sectors naturally integrate technological advancement with social inclusion.

A longer pattern section shows how rural enterprises combine traditional knowledge with technological innovation, particularly evident in studies from Sinaloa and Durango. These cases reveal unexpected and innovative savvy strategies arising



from resource-constrained environments. Among the significant findings, the role of institutional frameworks in enabling or constraining innovation across colour economies must be noted. The comparative analysis of innovation systems in Mexico and Costa Rica offers crucial insights into how regulatory environments shape innovation trajectories [30].

#### **4.2 Geographical and Sectoral Distribution**

A comparative understanding can be gained from the various contributions made by different institutions. The fact that the Universidad Autónoma de Baja California (UABC) (17 papers), CETYS (13 papers), and Universidad Nacional Autónoma de México (UNAM) (9 papers) all contributed significantly to the research implies that there are regional clusters of competence in particular colour economies. The Tijuana-Ensenada region is a particularly interesting case of orange-purple economy integration, where cultural industries interweave with inclusion initiatives. León-Pozo et al.'s [8] analysis of Baja California's creative industries demonstrates how territorial dynamics shape innovation patterns.

Gender distribution among lead authors (27 women, 39 men) reveals important patterns in research leadership, especially significant given the purple economy's emphasis on inclusion. This demographic data gains additional meaning when considered alongside the content analysis of women-led enterprises and gender-focused innovation studies.

#### **4.3 Thematic Concentration and Emerging Priorities.**

The distribution of papers across colour economies reveals unexpected concentrations. The Orange Economy was led by 19 papers suggesting a strong research interest in cultural and creative industries. This dominance reflects the maturity of creative sector research and its increasing relevance for contemporary development challenges.

Meanwhile, the yellow and purple economies were tied at 13 papers each, demonstrating equal research interest in technological efficiency and social inclusion. The green economy attracted 12 papers, focusing primarily on sustainable innovation and eco-entrepreneurship. This distribution suggests researchers are particularly drawn to intersections between different colour economies rather than single-domain studies.

Papers simultaneously examining multiple colour economies proved especially revealing. González Rubio et al.'s [6] smart cities research demonstrates

how yellow economy principles (technological efficiency) necessarily interact with green (environmental sustainability) and purple (social inclusion) considerations. Similarly, research on cultural industries in marginalised communities reveals natural convergences between orange and purple economy dynamics.

#### **4.4 Innovation Patterns and Theoretical Implications**

A more profound pattern emerges regarding the different types of innovations among colour economies. Papers from the purple economy indicate sophisticated social innovation techniques, in contrast to the yellow economy, which emphasises technological innovation. Orange economy research demonstrates how creative innovation often bridges technological and social domains.

The post-proceedings reveal innovation patterns specific to Latin American contexts. Unlike European approaches that seldom separate economic domains, Latin American initiatives frequently integrate multiple colour economies within single projects. This non-separation suggests that theoretical frameworks may need adjustment to capture suitable regional innovation dynamics.

#### **4.5 Theoretical Framework Refinement Based on Empirical Evidence.**

The post-proceedings challenge certain assumptions in existing colour economy theory. While initial frameworks suggested relatively distinct boundaries between different colour economies, empirical evidence reveals more fluid interactions. Particularly in Latin American contexts, initiatives routinely combine elements from multiple colour economies—not as an exception but as standard practice.

Several case studies fundamentally reshaped our understanding of innovation dynamics. The Durango ecotourism research demonstrates how green economy initiatives naturally evolve into purple economy outcomes through community engagement and social transformation. The study of trans entrepreneurship in Tijuana reveals how marginalised communities intuitively blend purple economy principles with yellow economy efficiencies, suggesting a more organic relationship between social inclusion and technological innovation than previously theorised.

#### **4.6 Regional Specificity and Framework Adaptability**

The convergence patterns identified in Baja California's creative industries suggest the need for regionally sensitive theoretical models. Unlike European models that often emphasise institutional structures or Asian approaches focusing on technological integration, Latin American experiences reveal unique hybrid forms combining formal and informal innovation systems.

Analysing innovation in resource-constrained environments reveals a particularly significant finding. The Sinaloa agricultural certification study shows how green economy principles adapt to local conditions, creating distinctive innovation patterns that existing theoretical frameworks struggle to capture fully.

#### **4.7 Methodological Innovations and Research Design**

The diversity of research approaches post-proceedings suggests necessary methodological refinements for studying colour economies. Traditional innovation metrics prove inadequate for capturing value creation across multiple colour domains. Several papers develop novel approaches:

1. Combined quantitative-qualitative methodologies that better capture complex interactions between different colour economies
2. Longitudinal studies revealing how colour economy initiatives evolve and interact over time
3. Participatory research methods involve communities analysing and theorising their economic innovations.

These methodological innovations could significantly impact the future of research design and theoretical development in the economics of colour.

#### **4.8 Implications for policy architecture and practice.**

The empirical evidence obtained in this post-proceedings is at odds with conventional policy approaches. When innovation and entrepreneurship initiatives organically comprise multiple economies of colour, traditional sectoral policies are considered insufficient and inadequate. Consider the case of creative industries in Tijuana-Ensenada: attempts to support these initiatives through purely orange economy policies miss crucial purple and yellow economy dimensions that enable their success.

Regulatory frameworks require substantial rethinking. Single-domain regulations often impede

rather than enable innovation across colour economies. Analysing smart city initiatives reveals how rigidly compartmentalised policies can unintentionally create barriers to integrated development.

Evidence suggests the need for more flexible support mechanisms that recognise and enable cross-colour initiatives. The case showing the experience of women-led enterprises in Durango demonstrates how successful ventures often navigate multiple regulatory environments simultaneously, so policy frameworks should adapt to environmental complexity.

#### **4.9 Evolution of practice and organisational learning.**

Organisations operating in economies of colour develop distinctive capabilities that existing theoretical models do not support well. These capabilities include, among others:

1. The ability to simultaneously orient toward multiple ways of creating value.
2. Ability to deal with different institutional logics.
3. Ability to incorporate into diverse knowledge systems.
4. Flexibility to mix formal and informal practices.

The success of cultural tourism initiatives, particularly in Indigenous communities, reveals sophisticated organisational practices that transcend traditional sector boundaries. These practices suggest new directions for theoretical development.

#### **4.10 Knowledge transfer and ecosystem development.**

Research in the northern border region of Mexico showed unique knowledge flow patterns between economies of colour. Unlike traditional models highlighting formal transfer mechanisms, these regions show more organic, community-driven knowledge-sharing approaches. Traditional academic frameworks still need to capture these dynamics adequately.

Informal innovation networks function at the intersections between economies of colour. They show greater effectiveness in developing and diffusing innovations than more formal, institutionalised structures. This finding may have a high resonance for how support in innovation ecosystems is contingent upon and operates.

Sustainability is not a separate consideration but an integral dimension across all colour economies. The evidence suggests successful initiatives naturally integrate environmental, social, and economic

sustainability, regardless of their primary colour designation.

The analysis reveals gaps in current theoretical understanding around evaluation metrics. Traditional performance indicators fail to capture the full value created when initiatives operate across multiple colour economies. New frameworks must account for these complex interactions and their multidimensional impacts.

Future research directions emerge organically from these findings. Critical areas include

1. Understanding temporal dynamics in colour economy interactions,
2. Developing more sophisticated impact measurement tools, and
3. Examining how different cultural contexts shape colour economy integration.

#### **4.11 Practical Considerations and Strategic Implications**

Evidence from Mexican regions demonstrate how local contexts fundamentally reshape colour economy initiatives. Urban implementations in Tijuana differ radically from rural applications in Durango, not merely in scale but in their basic operational logic. Consider how the same orange economy principles manifest differently: while Tijuana's creative industries leverage technological infrastructure and international connections, Durango's cultural initiatives build on community relationships and traditional knowledge systems.

Institutional architecture proves crucial yet problematic. Large institutions like UNAM demonstrate a capacity for complex cross-colour initiatives but often struggle with integration at the ground level. Counterintuitively, smaller organisations achieve better results through informal integration practices.

When faced with limited resources, organisations instinctively blur the boundaries of the colour economy, creating hybrid approaches that defy theoretical categories. The Tijuana trans-entrepreneurship study illustrates this phenomenon: participants naturally combine elements of the purple, yellow and orange economies without consciously theorising their approach. Technology adoption follows distinctly regional patterns. González Rubio et al.'s research reveals how northern border regions integrate technological innovation differently than central Mexican institutions. These differences suggest the need for more nuanced approaches to technology-driven transformation.

Leadership emerges as a critical yet under-theorised dimension. Women-led enterprises in Durango demonstrate distinctive approaches to

integrating multiple-colour economies. This finding suggests that gender dimensions deserve greater attention in theoretical frameworks.

A fascinating pattern emerges around risk and innovation. Organisations operating across colour boundaries often demonstrate greater resilience than those confined to single domains. The cultural industries analysis shows how the diversity of approach correlates strongly with impact sustainability.

Knowledge flows reveal counter-intuitive patterns. Traditional models emphasising top-down knowledge transfer fail to capture the complex reality of how innovations spread across colour economies. Community networks, informal associations, and cultural ties are more significant than formal institutional relationships.

Research infuses relevant implications for education and training. Current approaches to professional development are usually monochromatic and, therefore, do not adequately train professionals for the complex, multicoloured reality.

We have found that the interaction between rural and urban areas requires a particular approach. The cases show sophisticated patterns of interaction between the urban and rural implementation of colour economy initiatives, challenging reductionist centre-periphery models.

These findings indicate the need for an essential revision of:

1. The various support mechanisms for cross-cultural initiatives.
2. Evaluation frameworks for complex impacts
3. Training approaches for practitioners
4. Policy architecture at multiple levels

The evidence points toward a more integrated understanding of how colour economies function in practice while simultaneously revealing the inadequacy of current theoretical frameworks to capture this complexity fully.

#### **4.12 Extending Colour Economy Theory: Comparative Analysis**

While Sala-i-Martin [14] initially proposed colour economies as a framework to simplify complex economic principles, our post-proceedings reveal more intricate patterns of interaction. Unlike Segre's [37] conceptualisation of distinct intersecting sectors, evidence from Mexican regions demonstrates how colour economies naturally blend and evolve without clear boundaries. The trans entrepreneurship study in Tijuana particularly challenges Velasquez and Vrant's [38] "multicolour spectrum" model, suggesting that marginalised communities instinctively create hybrid forms that transcend theoretical categorisations.

Regional adaptations prove more sophisticated than previously documented. Where Gonzalez and Annayeskha [39] emphasise the orange economy's role in empowering marginalised communities through cultural industries, our findings from the Tijuana-Ensenada corridor reveal the simultaneous activation of purple and yellow economy principles. These enterprises do not simply link cultural heritage with global value chains—they create entirely new hybrid value creation models.

The methodological innovations suggested by Boyacıoğlu et al. [40] find strong empirical support in our postproceedings. However, Mexican cases suggest that even current mixed-method approaches inadequately capture the complexity of colour economy interactions. For example, women-led businesses in Durango show impacts that transcend quantitative and qualitative frameworks.

Venegas Álvarez's [41] emphasis on tax policy integration is consistent with our findings, although practice reveals more nuanced challenges. Small firms, in particular, demonstrate a remarkable ability to navigate regulatory complexity through informal adaptations, suggesting that policy frameworks should perhaps follow rather than lead practice.

A stark contrast emerges between Chernyaeva and Pakhomova's [42] emphasis on technological transformation and our findings regarding innovation patterns. While technology plays a crucial role, the post-proceedings reveal that social and cultural innovations often drive technological adoption, inverting assumed causality chains.

This comparative lens reveals the richness of colour economy theory and its current limitations in fully capturing ground-level reality. Our findings suggest new directions for theoretical development, particularly around the following:

1. Integration patterns in resource-constrained environments.
2. Role of informal networks in driving innovation.
3. Gender dimensions of leadership in the colour economy.
4. Cultural factors in technology adoption.

These insights add to the current theory. Thus, more dynamic models may be needed to understand the workings of the colour economy comprehensively.

#### **4.13 Theoretical Framework Revisitation and Extension**

The empirical evidence from the post-proceedings validates and challenges aspects of the initial colour economy framework presented in our introductory chapter. While Estrada et al. [43] propose a structured approach to understanding colour economies through

innovation and entrepreneurship lenses in their introductory chapter, our findings reveal more complex patterns. The Tijuana-Ensenada cases show how cultural industries naturally integrate multiple colour economies, suggesting theoretical boundaries are more fluid than initially conceived.

Regional specificities emerge as more significant than originally theorised. The northern Mexico experience reveals distinctive patterns of colour economy integration that differ from both European and Asian models. This experience extends Estrada et al.'s [43] initial conceptualisation by showing how local contexts actively reshape colour economy interactions rather than merely adopting them.

#### **4.14 Patterns of integration and framework development**

Our starting hypothesis about sustainability as a unifying theme in economies of colour finds strong support, albeit with important nuances. The data suggest that sustainability is expressed differently depending on the colour of the economies: Green and blue economies make it explicit through environmental protection. The yellow economy achieves it through technological efficiency. The purple economy rethinks and enriches it through social inclusion. The orange economy incorporates it into creative processes. The red economy evolves toward sustainable consumption practices. The silver economy links it to demographic adaptation. The grey economy integrates it through resource efficiency, social inclusion and innovative practices, often in a less visible way compared to formal economies.

The post-proceedings uncover innovation patterns transcending initial categorisations. González Rubio et al.'s [6] research on smart cities demonstrates unexpected convergences between technological innovation, environmental sustainability and social inclusion. This fact suggests the need for more dynamic theoretical models.

#### **4.15 Emerging Theoretical Contributions**

The analysis points toward several advances beyond the initial framework:

Innovation environments must include informal networks and community systems, not just institutions. Cultural factors shape colour economy interactions more significantly than Estrada et al. [43] initially proposed.

Resource flows between colour economies show complex transformations rather than simple transfers. Evidence suggests resources get recreated as they move across colour boundaries.

#### **4.16 Empirical Validation and Framework Extension**

The post-proceedings validate several key propositions from Estrada et al. [43] while suggesting important extensions. Their initial argument that colour economies represent practical frameworks rather than theoretical constructs finds strong support. However, the empirical evidence shows more sophisticated integration patterns. León-Pozo et al.'s work in Baja California demonstrates how creative industries naturally blend orange, purple and yellow economy elements without conscious effort to do so.

The hypothesis about cross-sector collaboration proves valid but insufficient. While Estrada et al. [43] emphasised government-industry-academia interactions, findings reveal crucial roles for informal networks and community knowledge systems. Lechuga-Nevarez and Hernández-Chavarria's [27] ecotourism study in Durango shows how indigenous communities integrate traditional knowledge with modern sustainability practices, proposing expanding collaboration frameworks.

#### **4.17 Regional Innovation Dynamics**

Mexican cases reveal distinctive regional patterns missing from initial theorisation. Northern border regions show unique integration capacities, especially in combining technological efficiency with cultural innovation. This finding extends the original framework by demonstrating how geographic and cultural contexts actively reshape manifestations of the colour economy.

Innovation flows differ from theoretical expectations. Rather than following institutional channels, many successful initiatives emerge from informal sector experimentation. The trans entrepreneurship study in Tijuana particularly challenges conventional innovation models by showing how marginalised communities create hybrid solutions combining multiple colour economies.

#### **4.18 Knowledge Creation and Transfer**

The post-proceedings suggest more complex knowledge dynamics than initially proposed. While Estrada et al. [43] emphasised formal knowledge transfer mechanisms, evidence shows significant innovation emerging from informal and traditional knowledge systems. This outcome advises the need to reconceptualise how knowledge moves between colour economies.

Cultural factors emerge as crucial mediators in knowledge transfer processes. Local cultural contexts do not just receive and adapt knowledge - they actively

transform it, creating new hybrid forms of understanding and practice. This finding substantially extends the original theoretical framework.

#### **4.19 Theoretical Refinements from Empirical Evidence**

Our empirical findings suggest several refinements to colour economy theory, as Estrada et al. [43] presented in the opening paper. Among them, their initial proposition about sustainability as a common thread among colour economies proves valid but needs expansion. Evidence from post-proceedings shows sustainability manifests through unexpected channels—not just environmental or social dimensions but novel combinations of multiple approaches.

Field evidence particularly challenges initial assumptions about innovation pathways. Estrada et al. [43] proposed structured innovation processes within each colour economy, but cases like González Rubio et al.'s [6] smart cities research show innovation frequently emerges at intersections between colours. These boundary-spanning innovations challenge our current understanding of the single colour initiatives, giving pace to multi-activity impactful advantages.

#### **4.20 Contextual Influences and Framework Adaptation**

The Mexican experience reveals strong contextual influences inadequately captured in the original framework. Border region dynamics documented by León-Pozo et al. [8] demonstrate how geographical and cultural factors reshape colour economy interactions. These context dynamics suggest the need for more flexible theoretical models to accommodate regional variations.

Innovation patterns show surprising independence from formal institutional structures. While Estrada et al. [43] emphasised institutional roles, many successful initiatives emerged from informal sector experimentation. Hernández-Chavarria et al.'s [10] paper on women-led enterprises reveals how informal networks often prove more effective at spreading innovation than formal channels.

#### **4.21 Framework Extensions**

Resource flows between colour economies need reconceptualisation. The initial framework suggested straightforward transfers, but evidence shows that resources often transform as they cross colour boundaries. Purple economy initiatives frequently

reimagine yellow economy technologies to serve social inclusion goals.

Knowledge creation processes require expanded theoretical treatment. Field evidence reveals significant innovation emerging from traditional and informal knowledge systems, suggesting the need to broaden how we conceptualise innovation sources in colour economies.

#### **4.22 Framework Evolution and Future Directions**

Field evidence pushes colour economy theory beyond the initial boundaries set by Estrada et al. [43]. Post-proceedings reveal a more dynamic innovation ecosystem than first conceptualised. Cases from northern Mexico show that informal actors often lead to integration between colour economies, which was not predicted in the original framework.

#### **4.23 Methodological Implications**

The research approach needs adaptation. Traditional innovation metrics fail to capture complex interactions found in post-proceedings. For example, Tijuana-Ensenada cultural industries simultaneously create value across multiple colour domains—social, technological, and environmental. We need new measurement tools.

Data from women-led enterprises challenges conventional evaluation methods. Hernández-Chavarría et al.'s [10] findings suggest that standard performance indicators miss important aspects of purple-orange economy integration. Mixed methods combining quantitative and qualitative approaches might work better.

#### **4.24 Geographic and Cultural Dimensions**

Regional patterns require more theoretical attention from stakeholders. While Estrada et al. [43] acknowledged the importance of context, evidence shows the deeper influence of geographic and cultural factors. Border region experiences documented in post-proceedings suggest a complete reimagining of how colour economies interact in specific locations.

Cultural factors shape innovation more than expected. Indigenous knowledge integration in Durango ecotourism reveals how the cultural context transforms theoretical concepts into practical applications. The framework needs expansion to better report these cultural dynamics.

#### **4.25 Boundary Conditions and Limitations**

Framework boundaries need clarification. The original theory assumed relatively clear lines between colour economies. Field evidence shows much blurrier boundaries, especially in informal sector activities. We need theoretical tools to analyse these hybrid forms.

Scholars must pay more attention to scale effects. Small enterprises often combine multiple colour economies differently than large organisations. Evidence suggests that theoretical frameworks work differently at different operational scales.

#### **4.26 Future Research Trajectories**

Innovation dynamics identified in post-proceedings open new research paths. While Estrada et al. [43] set a base for understanding colour economies through an innovation lens, field evidence suggests deeper study needs in specific areas:

First, the informal sector's role deserves more attention. Cases show that informal actors often pioneer integration between colour economies more effectively than formal institutions. How this happens needs systematic research, especially in the Latin American context.

Second, cultural mediation effects require investigation. Post-proceedings reveal a strong cultural influence on how colour economies combine and evolve. We need longitudinal studies tracking these cultural effects over time.

#### **4.27 Emerging Research Questions**

Several crucial questions emerge from empirical evidence:

1. How do informal networks facilitate knowledge transfer between colour economies?
2. What role does traditional knowledge play in colour economy innovation?
3. How do geographic contexts reshape theoretical frameworks?
4. What metrics best capture cross-colour value creation?

León-Pozo et al.'s [8] findings about creative industries suggest examining hybrid forms where multiple colour economies merge. González Rubio et al.'s [6] smart cities paper suggests studying technology's role in these combinations.

#### **4.28 Methodological Development Needs**

Current research tools show limitations. Standard innovation metrics miss important aspects of colour economy interactions. Evidence from Lechuga-Nevarez and Hernández-Chavarria [27] suggests need for:

1. New approaches for measuring informal innovation.
2. Better tools for evaluating cultural impacts.
3. Methods for tracking resource flows between colour economies.
4. Techniques for assessing hybrid value creation.

#### **4.29 Policy Research Implications**

The policy framework needs expansion based on evidence. Original guidelines proposed by Estrada et al. [43] require adaptation to:

1. Support informal sector innovation.
2. Recognise cultural factors in policy design.
3. Enable cross-colour integration.
4. Foster regional innovation systems.

#### **4.30 Research Agenda Development**

Post-proceedings signal specific research priorities:

Technology adoption patterns across colour economies need a deeper study. González Rubio et al.'s [6] contribution shows that technology often serves as a bridge between different colour domains, but the process remains unclear. How yellow economy innovations get adapted by other colour economies deserves attention.

Gender dimensions emerge stronger than expected. Hernández-Chavarria et al.'s [6] research on women-led enterprises reveals gender-specific patterns in managing multiple colour economies. We need a systematic investigation of gender roles in colour economy integration.

#### **4.31 Specific Research Lines**

Field evidence points toward three urgent research streams:

Regional integration mechanisms

- How do different regions combine colour economies distinctively? Northern Mexico cases show unique patterns needing documentation. Compare with other Latin American experiences.

Knowledge hybridisation

- Traditional and modern knowledge systems interact to create novel innovation forms. Durango ecotourism case shows promising research direction.

Resource transformation processes

- How do resources change character when moving between colour economies? Evidence suggests resources get redefined rather than just transferred.

#### **4.32 Theoretical Gaps**

Several theoretical areas need development:

1. Models explaining informal-formal sector interactions.
2. Frameworks for analysing cultural influences.
3. Tools for studying hybrid organisations.
4. Concepts for understanding regional variations.

Field evidence especially shows gaps in understanding temporal aspects. How colour economy combinations evolve remains unclear.

#### **4.33 Practical Research Needs**

Post-proceedings highlight practical research priorities:

1. Impact measurement tools development
2. Policy effectiveness evaluation methods
3. Best practices documentation
4. Implementation guidelines creation

León-Pozo et al.'s [8] findings suggest that the creative sector's role as an integration catalyst should receive special attention.

#### **4.34 Research Agenda Evolution**

Post-proceedings findings steer research priorities in unforeseen directions. Patterns of technology adoption in colour economies emerge as highly important but understudied phenomena. Research on smart cities by González Rubio et al. [6] reveals how technology bridges different colour domains, creating hybrid forms that current theory has difficulty explaining. This intersection between yellow economy innovations and other domains needs further research, especially in emerging and developing countries.

Across the colour palette, gender was a notable issue. Gender-specific patterns challenge the assumptions of Estrada et al.'s [43] initial framework, suggesting that gender can significantly influence interactions within economies of colour. Hernández-Chavarria et al.'s [10] study of women-led firms describes several distinct strategies for managing diverse economies of colour.

The mechanisms at the regional level show a surprising complexity. Northern Mexico's experience reveals unique integration patterns shaped by border dynamics, cultural factors, and economic pressures. These regional variations demand comparative studies across Latin America to understand how geographic and cultural contexts reshape colour economy interactions.

Knowledge systems deserve particular attention. Traditional knowledge does not simply combine with modern approaches - it transforms them, creating novel innovation forms. The Durango ecotourism case demonstrates how indigenous knowledge actively reshapes sustainability concepts, suggesting rich research possibilities in knowledge hybridisation processes.

Resource transformation processes need careful study. Field evidence indicates that resources undergo fundamental changes when moving between colour economies. Understanding these transformations could help explain how different colour economies successfully integrate in practice despite theoretical boundaries.

Temporal aspects remain poorly understood. How colour economy combinations evolve does not have a precise orientation, as current theoretical frameworks are limited to studying the dynamic aspects. The colour mix's response to external pressures and adaptation to changing circumstances requires longitudinal research approaches.

#### **4.35 Methodological Evolution Needs**

Field experience reveals limitations in current research approaches. Traditional innovation metrics struggle to capture complex value creation at intersections of the colour economy. When Lechuga-Nevarez [27] documents how ecotourism initiatives simultaneously generate environmental, social, and cultural impacts, conventional measurement tools must be revised.

Although qualitative analysis needs to be in-depth, it isn't easy to achieve. The case study on smart cities by González Rubio et al. [6] teaches about technological innovation and its complex web of social processes. The big challenge for research methods is to maintain rigour and move towards capturing the underlying dynamics. Participant observation could play a major role in this trajectory towards understanding the mechanisms of integration.

Case study approaches need refinement. While post-proceedings demonstrate case studies' value, current approaches often miss the crucial context. Hernández-Chavarria et al.'s [10] research suggest embedding researchers longer in studied communities to grasp subtle interaction patterns between different colour economies.

Longitudinal perspectives become essential. León-Pozo et al.'s [8] creative industry analysis reveals how colour economy interactions evolve, yet most research captures only moments. A great challenge ahead is to track developments across years despite institutional pressures for quick results.

Mixed methods show promise but require careful design. Combining quantitative metrics with ethnographic approaches could help capture measurable impacts and deeper social processes. However, integrating different data types presents theoretical and practical challenges that need attention.

Field researchers require new skills. Understanding colour economy interactions demands familiarity with multiple domains - technology, culture, environment, and social processes. Traditional academic specialisation may not adequately prepare researchers for this complexity.

#### **4.36 Research Capacity Building Challenges**

Experience from post-proceedings shows the need for different researcher preparation. Traditional academic training, focused on single disciplines, leaves researchers ill-equipped for colour economy complexity. When studying the Tijuana-Ensenada corridor, researchers needed a simultaneous understanding of technological innovation, cultural processes, and social dynamics.

Field evidence suggests important skill gaps. Researchers contend to capture informal processes that often drive colour economy integration. León-Pozo et al.'s [8] paper on creative industries revealed how crucial informal networks are, yet most researchers lack the tools to document these properly.

Language abilities emerge as an unexpected barrier. Many innovation processes happen in local contexts using regional expressions. González Rubio et al.'s [6] smart cities research shows how technical language mixes with local terminology, creating communication challenges for outside researchers. Beyond simple translation, understanding cultural meanings becomes crucial.

Community engagement needs researchers' more attention. Lechuga-Nevarez's [27] experience shows how Indigenous communities share knowledge differently than academics expect. Researchers need training in respectful engagement with different knowledge systems. Traditional academic approaches sometimes create barriers rather than bridges.

Cross-disciplinary collaboration poses special challenges. Researchers from different backgrounds often need help effectively communicating when studying colour economy interactions. Experience shows the need for a common conceptual framework while respecting disciplinary perspectives.



Methodological flexibility requires development. Researchers trained in rigid methodological traditions often miss important phenomena in the field. Evidence suggests a need for adaptable approaches that maintain rigour while responding to local conditions.

#### **4.37 Research Institution Development**

Post-proceedings evidence suggests institutional transformation needs. Universities studying colour economies must adapt structures originally designed for single-discipline research. Baja California's experience demonstrates how rigid departmental boundaries hinder understanding complex interactions between different colour economies.

Current research evaluation systems need to be revised. Traditional academic metrics poorly capture the value of cross-colour economy research. When Hernández-Chavarría et al. [10] study women-led enterprises combining multiple colour economies, standard publication metrics miss important impacts.

Funding mechanisms need to be rethought. Research crossing colour economy boundaries needs help fitting traditional funding categories. González Rubio et al.'s [6] smart cities paper required unusual funding arrangements to study technological-social-environmental interactions simultaneously.

Knowledge management systems show limitations. Universities struggle to integrate findings from different colour economy studies. Evidence suggests a need for new ways to organise and share cross-domain knowledge.

International collaboration patterns require adjustment. Post-proceedings reveal how Latin American institutions often unsuccessfully gear European or Asian frameworks. Regional specificities demand a more autonomous theoretical development.

Field evidence particularly challenges graduate education models. Current programs rarely prepare researchers for the complexity of studying colour economy interactions. Novel training approaches combining technical skills with cultural sensitivity appear necessary.

Research networks need restructuring. Traditional academic networks, organised around single disciplines, poorly serve colour economy research needs. Evidence suggests that more flexible, problem-focused network structures work better.

#### **4.38 Emerging Solutions and Future Directions**

Field experiences point toward practical solutions while revealing theoretical implications for future development. Mexican cases show how combining

informal networks with formal institutions strengthens research capabilities. The Tijuana-Ensenada corridor successfully integrates multiple knowledge systems when studying creative industries.

Regional research centres emerge as promising models. These centres better capture colour economy interactions by focusing on local context while maintaining international connections. Evidence from northern Mexico suggests the advantages of border location for studying integration patterns.

Knowledge exchange platforms need redesign based on field experience. Traditional academic publishing poorly serves cross-colour economy research needs. Post-proceedings suggest the potential for new sharing mechanisms combining formal and informal channels.

Training and education programmes require new foundations. Researchers are required to undertake simultaneous immersion in multiple fields. This training requirement is illustrated by success stories such as the ecotourism research in Durango, where the benefits of combining technical training with the development of cultural sensitivity were relevant.

The colour economy framework proposed by Estrada et al. [43] provides a valuable basis for understanding contemporary economic transformation. Post-research evidence extends this framework by revealing complex integration patterns, the importance of informal processes and the crucial role of cultural factors. Future research must address these empirical realities while maintaining theoretical rigour.

Interaction and hybridisation are the evolving mechanisms for the colour economies. Understanding these dynamics requires sustained research attention and institutional adaptation. The data indicate promising directions for both theoretical development and practical application.

#### **4.39 Future Research and Theoretical Integration**

The post-proceedings evidence, coupled with Rivera et al.'s [35] analysis of innovation in informal environments, suggests more complex interactions between colour economies than initially theorised. Their study of India's National Innovation Foundation (NIF) reveals how informal sector innovation often naturally integrates multiple colour economy approaches. This finding challenges traditional assumptions about boundaries between formal and informal economic activities.

Evidence from northern Mexico demonstrates distinctive patterns of informal innovation that differ from both Asian and European models. Where Rivera et al. [35] document India's systematic support for

informal innovators through NIF, Mexican cases show more spontaneous integration emerging from necessity. The trans entrepreneurship study in Tijuana particularly illustrates how marginalised communities create hybrid solutions combining purple, yellow and orange economy elements without institutional support.

Based on evidence from the field, it is imperative to rethink theoretically how economies of colour operate in informal settings. Following Rivera and colleagues [35], they record the evolution of NIF, whose practices provide useful information for developing support systems. Their research on how innovations obtained from the informal sector are evaluated and incorporated into formal systems is particularly relevant to contexts in Latin American countries.

The post-proceedings reveal significant regional variations in how colour economies combine. Border region experiences documented by León-Pozo et al. [8] demonstrate how geographic and cultural factors reshape theoretical frameworks. This relationship extends Rivera et al.'s [35] findings about contextual influences on informal innovation systems.

These insights suggest that colour economy theory must expand to better capture:

1. Informal innovation dynamics
2. Regional variation patterns
3. Cultural mediation effects
4. Resource transformation processes
5. Knowledge hybridisation mechanisms

The evidence suggests a more dynamic theoretical framework to accommodate the complex reality of how different colour economies interact, particularly in informal and marginalised contexts. This framework must recognise spontaneous integration patterns and the potential for systematic support mechanisms like those documented by Rivera et al. [35].

#### 4.40 Theoretical Framework Enhancement

Rivera et al.'s [35] analysis of informal innovation processes suggests several crucial extensions to colour economy theory. Examining NIF's role in India reveals how institutional support can validate and integrate informal innovations while respecting cultural contexts. This insight particularly matters for Mexican cases, where informal economic activities often demonstrate sophisticated integration of multiple colour economies without systematic support.

The post-proceedings evidence, coupled with Rivera et al.'s [35] findings, points toward three key theoretical developments:

First, informal sector dynamics require broader conceptualisation. The Tijuana-Ensenada cases show

how marginalised communities naturally combine elements from different colour economies to create viable solutions. This hybridisation extends Rivera et al.'s [35] observations about informal innovation capabilities.

Second, geographic and cultural factors emerge as crucial mediators. Border region experiences documented by León-Pozo et al. [8] demonstrate how local contexts actively reshape theoretical constructs. This reshaping builds on Rivera et al.'s [35] analysis of how cultural factors influence informal innovation systems.

Third, resource transformation processes need theoretical attention. Evidence shows resources undergo fundamental changes when moving between formal and informal domains, suggesting more complex dynamics than initially theorised by Estrada et al. [43].

## 5 Conclusions: Reflecting on Colour Economy Challenges and Opportunities

The Research Network on Teaching and Technological Innovation (RIDIT) has tracked technological innovation's evolution since 1993. The 2022 Conference marked a turning point. Analysing how digital and sustainable transformations reshape post-pandemic innovation landscapes exposed the need for new theoretical frameworks. This context sparked the exploration of colour economies as a comprehensive lens for understanding innovation and entrepreneurship's changing nature.

Post-proceedings evidence reveals complex patterns challenging traditional economic models. Regional cases demonstrate natural integration between different colour dimensions -environmental sustainability merges with technological efficiency and social inclusion, particularly in border regions like Tijuana-Ensenada. These integrations emerge organically, driven by necessity rather than policy, suggesting the need to reconceptualise innovation pathways.

Informal sector dynamics prove more sophisticated than initially conceived. Rivera et al.'s analysis of India's National Innovation Foundation, compared with Mexican experiences, shows informal actors often pioneering integration between colour economies. This insight particularly matters for Latin American contexts, where informal activities frequently demonstrate sophisticated combinations without systematic support.

Cultural factors emerge as crucial mediators poorly captured by existing frameworks. Indigenous knowledge in Durango actively transforms

sustainability concepts rather than passively receiving them. Gender dimensions surface repeatedly. Hernández-Chavarría et al.'s [10] research reveals that women-led enterprises simultaneously develop distinctive approaches to managing multiple-colour economies.

Current research methods contend to capture complex value creation across colour domains. Evidence suggests a need for novel methodological approaches combining quantitative metrics with ethnographic understanding. Universities must adapt structures originally designed for single-discipline research. Field experience shows how rigid boundaries hinder comprehension of colour economy interactions.

Policy frameworks require substantial rethinking. Single-domain regulations often impede rather than enable cross-colour innovation. Smart city initiatives reveal how compartmentalised policies create unintended barriers. Evidence indicates a need for more flexible support mechanisms that recognise natural integration tendencies while respecting cultural contexts.

These findings extend the initial framework proposed by Estrada et al. [43] while revealing limitations in capturing economic transformation's full complexity. Success requires moving beyond rigid theoretical boundaries toward more dynamic models accommodating spontaneous and supported integration patterns. Understanding these dynamics demands sustained research attention, institutional adaptation, and a particular focus on informal sector contributions.

The colour economy framework offers fresh insights into innovation and entrepreneurship patterns. Evidence reveals how marginal actors create sophisticated hybrid solutions combining multiple colour economies - like Tijuana's trans entrepreneurs blending purple (social inclusion), yellow (technological efficiency) and orange (creative) approaches. These solutions challenge assumptions about innovation requiring formal institutional support.

Knowledge flows differently in colour economies. Traditional top-down models miss how informal networks and cultural ties drive innovation diffusion. Border region experiences show community networks are often more effective than formal channels at spreading innovations across colour boundaries.

Entrepreneurship patterns reveal unexpected dynamics. Women-led enterprises develop distinctive approaches to managing multiple colour economies simultaneously. Indigenous entrepreneurs actively transform sustainability concepts rather than merely adopting them. These findings suggest that entrepreneurial agency shapes colour economy interactions more than previously theorised.

## 5.1 Practical implications emerge for different stakeholders:

### 5.1.1 For researchers:

1. Need new methodological tools capturing complex value creation across colour domains
2. Must study informal innovation networks and cultural mediation effects
3. Should examine gender dimensions in colour economy integration

### 5.1.2 For managers:

1. Recognise the benefits of consciously combining multiple colour economies
2. Build capacity for navigating different institutional logics
3. Develop skills in informal network engagement

### 5.1.3 For policymakers:

1. Design flexible frameworks enabling cross-colour initiatives
2. Support informal sector integration while respecting cultural contexts
3. Create incentives for hybrid value creation

The colour economy lens reveals innovation and entrepreneurship as more dynamic, culturally embedded processes than traditional models suggest. Success requires understanding how different economic domains naturally integrate in practice while building support systems that enhance rather than impede these organic patterns.

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