




Best Practices of competitiveness and innovation in Global Value Chains Review: An approach to achieving global development goals. SDGs.

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Abstract—*This paper makes a documentary review on trends in practices and best practices around innovation and competitiveness for the configuration of global value chains (GVC) through the application of information and communication technologies (ICT) in the framework of sustainable development goals (SDGs), for which exploratory and descriptive research is developed through the review of databases between 2010 to 2023. Within the findings and by similarity and recurrence of concepts, practices are focused on the perspectives of operations, knowledge, relationships, governance, business models, and sustainability. Innovation practices are associated with sustainability concerns and product life cycles. ICT practices consolidate technologies as application tools in operations, strengthening customer-supplier alliances, and proposing new business models for access to them. Finally, competitiveness is the result expressed as the generation of network value, for which knowledge flows are necessary to enable the development of operational, technological, and dynamic capabilities to adapt to the market ensuring sustainability.*

Keywords— *Global value chain, competitiveness, innovation. Information and communication technologies, sustainable development goals.*

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Abstract—*This paper makes a documentary review on trends in practices and best practices around innovation and competitiveness for the configuration of global value chains (GVC) through the application of information and communication technologies (ICT) in the framework of sustainable development goals (SDGs), for which exploratory and descriptive research is developed through the review of databases between 2010 to 2023. Within the findings and by similarity and recurrence of concepts, practices are focused on the perspectives of operations, knowledge, relationships, governance, business models, and sustainability. Innovation practices are associated with sustainability concerns and product life cycles. ICT practices consolidate technologies as application tools in operations, strengthening customer-supplier alliances, and proposing new business models for access to them. Finally, competitiveness is the result expressed as the generation of network value, for which knowledge flows are necessary to enable the development of operational, technological, and dynamic capabilities to adapt to the market ensuring sustainability.*

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I. INTRODUCTION

Global value chain (GVC) is understood as the specialization of productive decisions based on the needs of the consumer or buyer, integrating each of the links involved up to the suppliers with a global approach not only referring to goods and services but also to work teams and the generation of ideas in the network, promoting value in the product and in the process, efficiency, and productivity for the development of local networks (clusters) that constitute the cornerstone for the consolidation of GVC.[1].

Therefore, GVC is profiled in terms of the value added to the product at each stage of the supply chain [2]. For a local company, the degree of insertion in the global market in the consolidation of a value network can be measured in terms of the participation of foreign investment, corporate alliances, level of imports of raw materials and inputs, level of exports, sale of a finished product or semi-finished product, direct sales to the customer or use of intermediaries or distribution channels. [3].

GVCs are measured in the ability to integrate all the actors involved in the supply chain for the generation of value, which involves tangible and intangible activities, this implies costs and risks since it is an integration of companies with different levels of development and competitiveness in a global market [4].

GVCs need to be world-class, for which they must respond to practices of excellence, from infrastructure, human capital, digital transformation, and strengthening of markets that allow the exchange of ideas, technology, research, and development allowing their expansion and sustainability. [1].

To be sustainable implies social, economic, and environmental development as an agreement of wills that must be in line with SDGs set out in the 2030 Agenda, where in particular SDG 9, Infrastructure and Industry, companies play a crucial role to do not impact the environment and can build networks, incorporating small and medium-sized enterprises as business partners within their value chain, allowing the appropriation of ICT, the development of innovation and research in the creation of new knowledge. [6].

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Businesses in turn should contribute to the achievement of SDG 9 by strengthening the use of ICTs along supply chains for value generation, strengthening business relationships between participating actors that promote technological capacity and innovation management for sustainable industrial growth. [7].

This document makes a documentary review on trends in practices and best practices around innovation and competitiveness for the configuration of GVCs through the application of ICT in the framework of SDGs, for which exploratory research of qualitative approach is developed through the review of databases and a descriptive approach in the analysis of the most relevant research of the scientific community to identify the progress of research from the cases studied.

II. MATERIAL AND METHOD

The research is exploratory and descriptive of a qualitative approach based on the review of secondary sources of authors from search equations in the indexed databases of Web of Science and Scopus filtering the resources from 2010 to 2023 about three search topics: line 1 - "global value chain" AND "competitiveness", line 2 - "global value chain" AND "innovation", line 3 - "global value chain" AND "information and communication technologies, ICT".

For each search line, information is collected by filtering the findings through the addition of the term "PRACTICES" and finally "BEST PRACTICES", which is intended to outline the state of progress of the research from these 3 perspectives, making a review of the state of knowledge of authors, selected by relevance in a non-probabilistic sample by convenience.

Finally, the findings are filtered in the "SUSTAINABLE DEVELOPMENT GOALS -SDGs" keywords to identify the composition of the most influential objectives in the lines of research, as shown in Table 1.

TABLE 1
METHODOLOGY

Methodology		
Exploratory	Descriptive	Frame
SEARCH EQUATION "Global Value Chain" AND	Stage of Knowledge	SGDs
Line 1: "Competitiveness". Line 2: "Innovation" Line 3: "ICT"	"Practices" "Best Practices"	
DATABASE: Scopus and Web of Science		
Frame: 2010 to 2023		

2023. Authors.

III RESULTS AND ANALYSIS

Initial exploration of the Web of Science and Scopus databases on the general scientific production in the 3 defined lines of research around GVCs concerning competitiveness, innovation, and ICT.

From these initial results, it was identified that the greatest scientific production in GVC is focused on innovation, followed by competitiveness, and finally on the application of ICT. Subsequently, a refined review is initiated in each of the defined lines of research, as indicated below.

TABLE 2.
SCIENTIFIC PRODUCTION IN GLOBAL VALUE CHAIN

Database	GVC AND Competitiveness	GVC AND Innovation	GVC AND ICT
Scopus	875	1661	289
Web of Science	637	2715	164

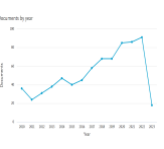

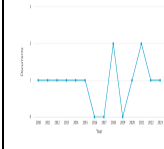
2023. Database Search. Scopus and Web of Science

A. Line 1: Global Value Chain AND Competitiveness.

Based on the Scopus database, a review of the evolution of scientific production in GVCs from the perspective of competitiveness is carried out, considering a window frame from 2010 to 2023. Scientific production has a positive trend, reaching more than 80 documents by 2022.

In terms of practices for competitiveness in GVCs, the annual production is variable, oscillating in more than 5 documents by 2022, with a similar behavior in the production of best practices for competitiveness, ranging from 1 to 2 documents for the same period. Table 3 lists the most relevant authors, countries, and sponsors.

TABLE 3
SCIENTIFIC PRODUCTION IN GLOBAL VALUE CHAIN AND COMPETITIVENESS

Item	GVC AND Competitiveness	AND Practices	AND Best Practices
Initial	875		
2010 to 2023	735	79	13
Yearly Production	>80	>5	1 to 2
			
Authors	Gotto K; Strasser J; Xing L	Nanto D.J; Strasser J; Tadele	Addoti, C. Ahmad, B.; Ahmad, U. S
Countries	China; United States; United	Germany; India; United Kingdom	

OPERATIONS	KNOWLEDGE
Digitalization for decision-making. Balance off-shore and on-shore. Standardization to improve performance	Innovation Hubs Promoting and developing local Jobs. Lifelong learning
Change management by adapting processes according to markets.	
RELATIONSHIPS	GOVERNANCE
Integration and collaboration with suppliers. Dual supply sources	Corporate governance towards excellence culture Transparency on value chains Policies to support producers to enter global markets
SUSTAINABILITY	BUSINESS MODEL
-	Related and Unrelated diversification

	Kingdom
Relevant Sponsors	National Nature Science Foundation of China. European Commission Department for International Development Japanese society for the promotion of science.

2023. Database Search. Scopus.

The knowledge areas where the greatest academic production in practices and best practices for competitiveness are decision and computational sciences, environmental sciences, engineering, and business, as indicated in Figure 1.

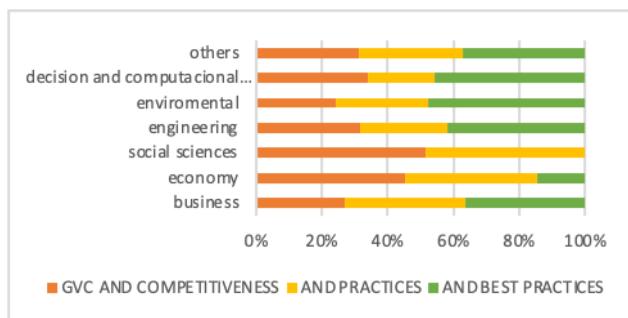


Figure 1: 2023. Research Subject Areas GVC AND Competitiveness. Database search Scopus.

Digitalization is a key component for the development of local networks. In South Africa's agricultural value networks, the consolidation of digital innovation hubs through knowledge management is relevant to ensure sustainable chains. [8]. In Australia's food networks, it is important to apply resilient practices for competitiveness and restructuring the business models, for which it is necessary to balance the onshoring and offshoring operations of the value network [9]. Non-traditional exports in Africa refer to the generation of value that is key to the economic and social advancement of organizations and communities involved in supply networks [10].

In the case of China, best practices in the supply chain are based on collaboration, alliances with suppliers, network visibility, cost transparency, preventive risk management,

networked decision-making, global relationships, and dual sourcing. [11].

The trends identified in terms of practices and best practices for competitiveness in GVCs, according to similarity and recurrence of subjects, authors classify into four categories: operations, relationships, knowledge, and governance, are shown in Figure 2.

Figure 2: 2023. Practices and best practices for competitiveness in GVC. Based on: [9], [10], [11], [12], [13], [14], [15], [16] and [17].

B. Line 2: Global Value Chain AND Innovation

Continuing with the Scopus database, the evolution of scientific production in GVCs from the perspective of innovation, in the window frame from 2010 to 2023, has a positive trend, with an annual production of more than 185 documents by 2022. Regarding the application of innovative practices in GVCs, the annual production stands at more than 25 documents and 3 to 4 in best innovative practices by 2022.

Table 4 lists the most relevant authors, countries, and sponsors.

TABLE 4
SCIENTIFIC PRODUCTION IN GLOBAL VALUE CHAIN AND INNOVATION

Item	GVC AND Innovation	AND Practices	AND Best Practices
Initial	1661		
2010 to 2023	1437	247	39
Yearly Production	>195	>25	3 to 4
Authors	Gereffi, G.; Di Maria, E; PietroBelli, C.	Gardetti, M.A; Geissler, B Gualandris, J	Amaya, K.; Ambrosiak, A.A Anguita D.
Countries	United States; China; United Kingdom		United States, Italy. United Kingdom
Relevant Sponsors	National Nature Science Foundation of China. Economic and Social Research Council European Commission Industrial Technology Research Institute		

2023. Database Search. Scopus

The areas of knowledge where the greatest academic production in best practices for innovation are environment, engineering and economics, decision and computational sciences, environmental sciences, engineering, and business, as indicated in Figure 3.

OPERATIONS	KNOWLEDGE
Material and product redesign Operational capabilities (functional, regulatory, network)	Open Innovation Interdisciplinary thinking Intellectual property rights Technology transfer policies Dynamic capabilities (sensing, seizing, transforming) Networked knowledge exchange
RELATIONSHIPS	GOVERNANCE
Strengthening supplier and customer relationships. Collaboration of local and global stakeholders.	Shared Values Shared Responsibility Join economic, industrial, and environmental policies
SUSTAINABILITY	BUSINESS MODEL
Circular Innovation Value Generation (life cycle)	Production offshoring Servitization Marketing process coordination

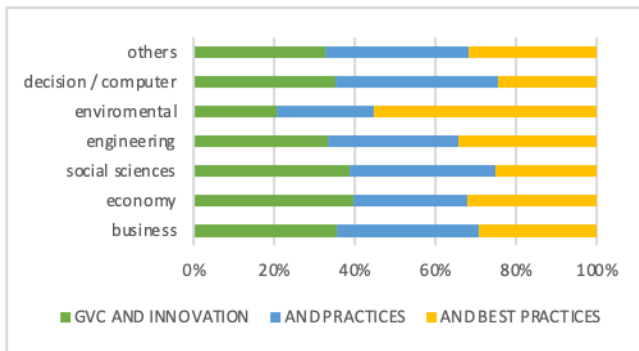


Figure 3: 2023. Research Subject Areas GVC AND Innovation. Database search Scopus.

GVCs are competitive not so much by focusing on cost efficiencies and profitability but rather from a social and environmental perspective that considers local value creation through innovation. [18]. In the textile and fashion sector, circular innovation encompasses practices in the supply chain through the incorporation of mini-knowledge loops in the value networks that link the different actors involved in the product life cycle [19]. In the case of agri-food chains, the generation of value from innovation is based on the definition of the stakeholders, resources, operational and dynamic capabilities, value-generating activities, network exchanges, and process standardization. [20].

GVCs must respond to a modern industrial policy oriented towards research and development, through knowledge generation and collaboration for value addition through offshoring of production and servitization, by providing supplementary services tailored to customers' needs [21], [22].

Companies that have a closer relationship with suppliers and customers have better performance in the development of innovative capabilities, research and development, and eco-friendly products [23]. Regarding the future of food security, according to a study aimed at 2050 in the analysis of cases in

emerging economies in Asia and Africa, in global, regional, and national networks, the importance of strengthening policies for technology transfer, intellectual property, and the relevance of international collaboration for innovative capacity building, training of human talent and networking. [24].

The trends identified in terms of practices and best practices for innovation in GVCs, according to similarities and recurrence of concepts, authors classified into six categories: operations, relationships, knowledge, governance, business models, and sustainability, as shown in Figure 4.

Figure 4: 2023. Practices and best practices for innovation in Global value chain. Based on: [16], [17], [18], [19], [20], [21], [22], [23], [24], [25].

C. Line 3: Global Value Chain AND ICT

Regarding the evolution of scientific production in GVCs from the perspective of ICT in the window frame from 2010 to 2023, it has a positive trend, with an annual production of more than 35 papers by 2022. However, in terms of ICT practices in GVCs, the annual production of practices and best practices is reduced, standing at 1 to 2 documents by 2022.

Table 5 lists the most relevant authors, countries, and sponsors.

TABLE 5. SCIENTIFIC PRODUCTION IN GLOBAL VALUE CHAIN AND ICT

Item	GVC AND ICT	AND Practices	AND Best Practices
Initial	289		
2010 to 2023	230		
Yearly Production	>35	2	1
Authors	Stroup, T, Christensen, C., Cieslik, E	Ahn, N.Y. Asongu, S.A, Bello-Bravo	Bello- Bravo, Grimasshevich. O.N. Yashin. N. S
Countries	United States, China, United Kingdom, India	India, United Kingdom, United States	
Relevant Sponsors	National Nature Science Foundation of China. Deutsche Forschungsgemeinschaft European Commission China, Research Grants Council, University Grants Committee.		

2023. Database Search. Scopus

The areas of knowledge where the greatest academic production in best practices for ICT are economics, decision

OPERATIONS	KNOWLEDGE
Off- Shore manufacture (3D printing, Robotics). Additive manufacture (CAD-CAM) Visibility and monitoring (Cloud store, Blockchain) Decision Making (Simulation and Predictive Models)	Knowledge interchange (Data Analytics) Financial resources Horizontal and vertical knowledge flows
RELATIONSHIPS	GOVERNANCE
Contracting with suppliers (performance, service response time) ERP and CPFR systems Alliance with external ICT partners	Technological capabilities (infrastructure, organizational culture, human skills) Strategic Alignment (Shared forecasting, logistics operations, risk management) Alignment of the Supply Chain design for customers' needs (permanent or transitory) Specialization of processes (Comparative advantages of network nodes)
SUSTAINABILITY	BUSINESS MODEL
–	Coordination and digital markets (E-commerce, e-procurement, e-logistics) Access to technological services (Pay-as-you-go business models)

and computational sciences and engineering, as indicated in Figure 5.

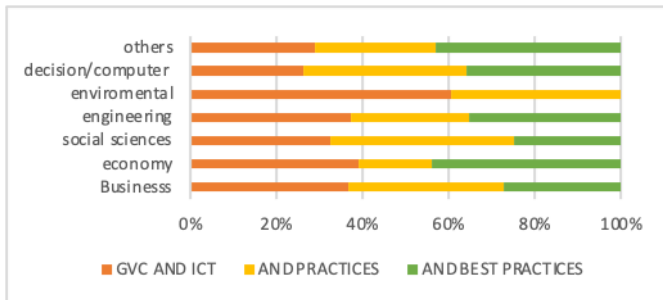


Figure 5. 2023. Research Subject Areas GVC AND ICT. Database search Scopus

The advanced technologies of Industry 4.0 contribute significantly to GVCs, transforming them into digital ecosystems. For instance, 3D printing, and robotics enable short (domestic) networks. Blockchain, big data, and the Internet of Things facilitate communication between network partners, decision-making, risk reduction, and rapid response to change. In addition, Cloud storage and blockchain facilitate the relationship and performance management of digital network platforms.

Data analytics promotes the exchange of knowledge. Adopting advanced technologies requires a combination of resources and capabilities, not only in technological

infrastructure but also in the development of human talent skills and organizational culture. [26], [29].

The trends identified in terms of practices and best practices in ICTs in GVCs, which the authors classify according to their similarities in five categories: operations, relationships, knowledge, governance, and business models, are shown in Figure 6.

Figure 6: 2023. Practices and best practices for ICT in Global value chain. Based on: [26], [27], [28], [29], [30], [31], [32], [33], [34], [35].

The adoption of ICTs allows the elimination of integration barriers in supply chains and reduces asymmetries of power, resources, size, knowledge, and information of the actors participating in the network. At the same time, the application of shared network collaboration strategies such as ERPs, CPFR, and RFID frameworks that promoting the contracting of suppliers based on performance and response times in the service. Thus, 3D printing enables the application of additive manufacturing, thereby reducing supplier dependency. Access to ICT is provided through pay-as-you-go business models. [27], [30].

ICTs facilitate access to information for rational decision-making and thus promote specialization in GVCs by optimizing comparative advantages in the location of production and marketing.[28]. ICTs allow horizontal and vertical knowledge flows in value, inter-organizational and intra-regional networks. At the same time, they promote coordination in commercialization processes and the elimination of intermediation barriers, making marketing actions more effective. [31].

D. Global Value Chain AND SDGs.

In terms of the development objectives of the global value chains in terms of competitiveness, innovation and ICT, scientific production focuses mainly on objective 9, Innovation in industry and infrastructure, as indicated in Figure 7.

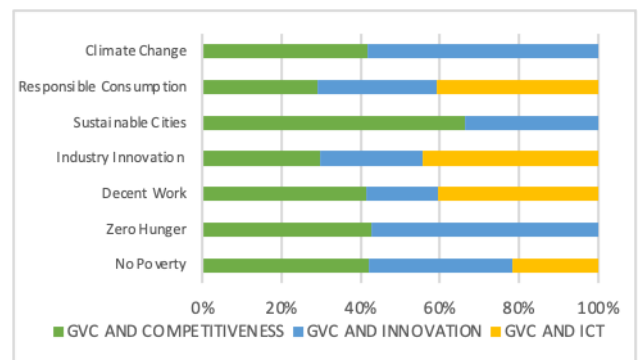


Figure 7. 2023. GVC AND SDGs. Database search Scopus

REFERENCES

Innovation in GVCs is associated with the SDGs, developing processes that link local and global actors and enable capacity building as well as the definition of economic policies towards sustainability [36]. Innovation processes should be seen as a shared responsibility, within the framework of sustainable development objectives and corporate social responsibility [37].

In general, innovation in GVCs is focused on sustainability, aiming significantly at SDG 9, Industry, innovation, and infrastructure, generating, and capturing value throughout the product life cycle, for which it is necessary to have a shared vision among the actors participating in the networks, through collaboration mechanisms, open innovation, and the development of operational and dynamic network capabilities.

IV. CONCLUSIONS

A documentary review is made on the trends in practices and best practices around innovation and competitiveness for the configuration of GVCs through the application of ICTs within the framework of the SDGs. The greatest scientific production is about innovation, then competitiveness, and lastly ICT. It is found that by similarity and recurrence of concepts, practices, and best practices are focused on the perspectives of operations, knowledge, relationships, governance, business models, and sustainability. Innovation practices are associated with sustainability concerns and product life cycles.

ICT practices consolidate technologies as application tools in operations, strengthening customer-supplier partnerships, and proposing new business models for access to them such as pay-as-you-go.

Finally, competitiveness is the result expressed as the generation of network value, for which it is necessary to efficiency in information flows, but also knowledge flows that allow the development of operational, technological, and dynamic capabilities to adapt permanently to market changes ensuring sustainability.

This highlights the importance of lifelong learning, the creation of innovation hubs in the network, and the permanent transformation of business models that promote transparency and a culture of excellence of the participating actors, based on corporate governance of shared values that allows the strategic alignment of the network.

In the future, the research is projected towards the development of a methodological proposal for the validation of good practices of innovation and competitiveness: an approach towards GVC.

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