Upgrading in Global Value Chains: The role of knowledge and technological capabilities

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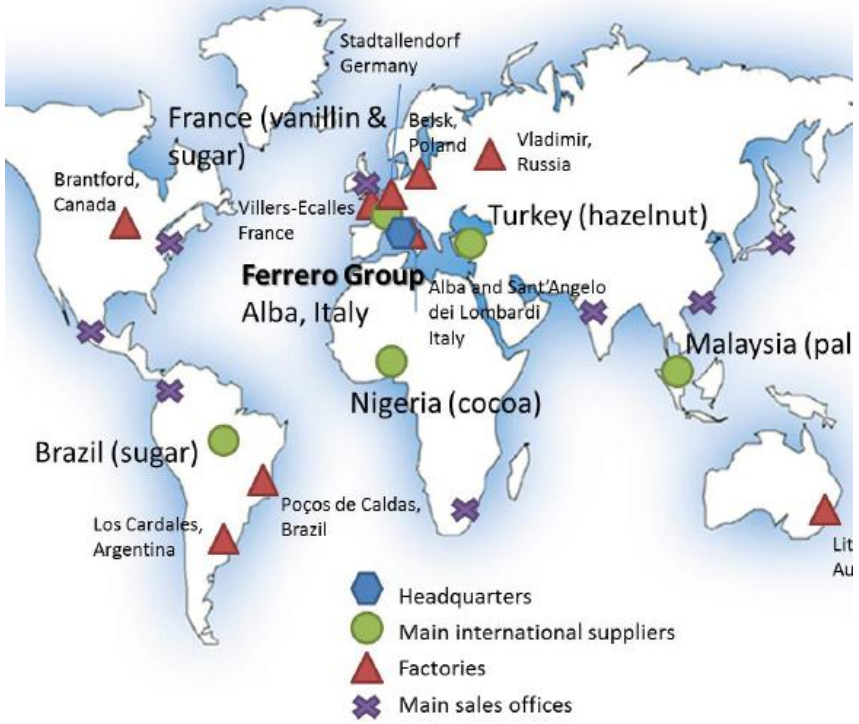
UNCTAD – March 20 2014

UNIVERSITÀ DI PAVIA

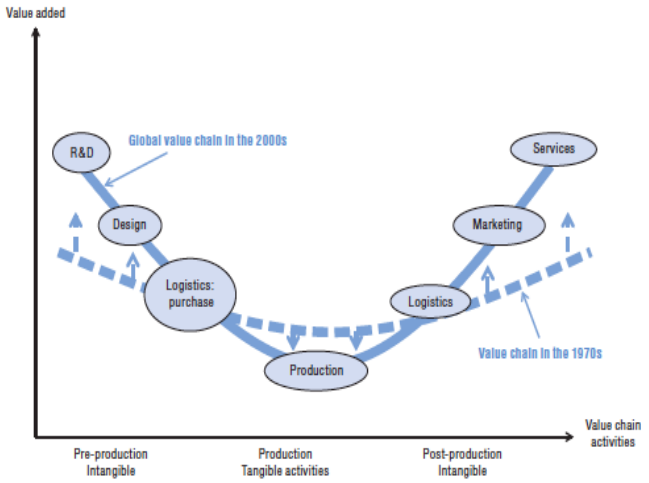
The Nutella GVC

Figure 6. The Nutella® global value chain



Sourcemap and various on-line sources.

Value Added along the GVC: The Smiling Curve:



Source: Based on Shih (1992), Dedrick and Kraemer (1999), and Baldwin (2012).

- In GVC the most value creation is often found in:
  - **upstream activities** such as design, product development, R&D and manufacturing of key parts and components;
  - **downstream activities** such as marketing, branding and customer service;
- **Assembly,** often offshored, to emerging economies, **represents only a small part of value generation**.

Economic Upgrading in GVC

- Economic upgrading is **moving up the value chain** through:
  - the **efforts of companies;**
  - **conducive (national/regional/local) innovation and business systems**;
- There are four types of upgrading:
  ① Process upgrading;
  ② Product upgrading;
  ③ Functional upgrading;
  ④ Inter-sectoral/inter-chain upgrading.

Process and Product Upgrading

① **Process upgrading** implies reduction in costs, productivity and flexibility increases by reorganizing the production system or investing in new or better equipment/technology;

② **Product upgrading** involves a shift to more sophisticated, complex, better quality products as well as producing a larger range of products.

③ Functional upgrading (and downgrading)

- Changing the mix of activities and **acquiring new skill intensive functions** (i.e. from manufacturing to design);
- Sometimes **downgrading** can be the right strategy: the case of the **South African Wine Industry** (Ponte & Ewert, WD 2009):
  - Grape growers **downgrade** to produce higher volumes of lower quality grapes (for brandy) to gain a **volume premium**;
  - Wholesalers, who used to have their own agencies in the UK, are divesting or entering in joint ventures with European based trading partners;
  - Much of product innovation, new packaging and styles are generated by UK/European agents: retailers are increasingly shelf-space providers.

④ Intersectoral/inter-chain upgrading

- Applying competences acquired in one function of a chain and using them in a different sector/chain;
- **Sinos Valley shoe producers** (Brazil) have functionally upgraded (moving up to design, branding and retailing) in the **domestic/regional value chain**:
  - Leveraging their production capabilities acquired in the US value chain;
  - 'Made in Brazil' program promoted by the local business association to create a local design capability and a brand.

Upgrading in GVC is conditioned by governance

GVC governance depends on:

- The **complexity of the information** exchanged between actors in the chain;
- The **codification of the the information** into clearly defined rules, norms and standards;
- The level of **suppliers competence**.

Governance Type	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base	*Degree of explicit coordination and power asymmetry*
Market	Low	High	High	*Low*
Modular	High	High	High	
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	*High*

Table IV.9. Learning mechanisms within GVCs

Governance type	Technology/knowledge-related determinants of governance types			Predominant learning mechanisms
	Complexity of transactions	Codification of transactions	Competence of suppliers	
FDI (ownership hierarchy)	High	Low	Low	• Imitation • Turnover of skilled managers and workers • Training by foreign leader/owner • Knowledge spillovers
NEMs:				
- Modular	High	High	High	• Learning through pressure to accomplish international standards • Transfer of knowledge embodied in standards, codes, technical definitions
- Relational	High	Low	High	• Mutual learning from face-to-face interactions
- Captive	High	High	Low	• Learning through deliberate knowledge transfer from lead firms; confined to a narrow range of tasks – e.g. simple assembly
Trade (market)	Low	High	High	• Learning from exporting or importing • Imitation

Source: Adapted from Pietrobelli, C. and R. Rabellotti (2011) "Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries?", *World Development*, 39:1261-9.

How can policy support upgrading within GVC? The role of business and innovation systems

	Governance Type	Determinants	Innovation Systems
1	**Market**	Low complexity	
		High codification	MSTQ organizations matter
		High supplier competence	Education, training organizations matter
2	**Modular**	High complexity	
		High codification	MSTQ organizations matter
		High supplier competence	Education, training organizations matter
3	**Relational**	High complexity	"Local" systems and complementary knowledge matter
		Low codification	MSTQ are perhaps less crucial
		High supplier competence	Education, training organizations matter
4	**Captive**	High complexity	
		High codification	MSTQ organizations matter
		Low supplier competence	
5	**Hierarchy**	High complexity	Local R&D organizations may benefit from interaction
		Low codification	
		Low supplier competence	GVC is expected to improve human technical skills

A well-structured, complete, smooth system makes **1-2-3** more likely to occur.
4-5 may prevail also with 'poorer', fragmented systems. The chain leader may compensate system weknesses, but upgrading is restricted.

Possible Dynamics

- **From 5 and 4 to 2:** thanks to improvement in MSTQ
- **From 5 and 4 to 3**: thanks to improvement in "local" systems
- **From 5 and 4 to 2 and 3**: thanks to IS supporting the co-evolution of suppliers and GVC competences

Source: authors' elaboration

Well functioning ISs facilitate relational forms of governance

- **Active technical bodies** where the chain leaders and their local partners can meet, ease the exchange of knowledge and reduce the complexity of transactions. **This is common in clusters**;
- **Electronics in Jalisco (Mexico):** the development of an efficient IS has supported the transition from hierarchy and captive chains led by foreign leaders to the creation of a local innovation capacity and functional upgrading undertaken by domestic firms;
  - **Policy instruments**: training programs, high tech incubators, Science and Technology program co-developed by the State and the private sector.

Codification of transactions & IS

- Well functioning standards and metrology organizations facilitate the handling of complex transactions and modular chains are more likely to prevail;
- **Salmon in Chile:** learning to comply with standards it has achieved the involvement of local firms both as value chain leaders and qualified suppliers in foreign-led chains.
  - **Policy implications**: a meso-level institution, the Association of Salmon Industries, has played a crucial role in supporting local firms to upgrade their capabilities (Pietrobelli and Rabellotti, 2007).

Suppliers' competence & IS

- Increasing capabilities in the supply-base help to push the architecture of GVC away from hierarchy and captive networks and towards more relational and modular chains;
- **Wine in Chile and South Africa** (Giuliani, Morrison and Rabellotti, 2011):
  - Public-private partnership in research consortia involving companies, business associations and universities have facilitated the upgrade of the local wine producers;
  - In SA, WINETECH has implemented a participatory mechanism involving wine companies and researchers to set up the research agenda.

Summing up the policy implications

- Promote and sustain the **identification of new alternative GVC** in which functional upgrading could be possible (the Sinos Valley case);
- Support SMEs in **complying with international standards.** This is key in the agro-food industry (the salmon case in Chile);
- Sustain the **upgrading of local suppliers** through a well functioning IS (the Jalisco case);
- Experiment with **new forms of private-public partnerships** (participatory systems for setting research agendas, intermediary organizations linking small firms with universities) (the wine case in Chile and SA).

Thank you

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For related papers
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Giuliani E., Morrison A., Rabellotti R., 2011, *Innovation and Catching Up: The changing geography of wine production*, Chelthenam: Edward Elgar.

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