Abstract

The debate on how to reconcile the global and local perspectives on manufacturing activities in global value chains demands informative empirical evidence. By leveraging the global value chain framework, this chapter develops an original mapping methodology of manufacturing firms to be applied at the industrial district (ID) level, to capture both the within-district heterogeneity and the global propensity of the ID. The case of the textile and clothing district in Bergamo highlights the potential of the methodology, which relies on quantitative data and *ad hoc* indicators (i.e. uniqueness and variety of the production activities). The results provide insights on how companies in the district under analysis strive to find distinctive traits in their manufacturing capabilities that could enhance their competitiveness in the district and in the global value chain. The analysis is complemented by presenting two short cases of local lead firms, which appear to be key actors in the connection between the ID and the global markets.

Keywords: Value Chain Mapping; Global Value Chain; Industrial District; Within-district heterogeneity; Quantitative study; Survey; Case studies

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The role of manufacturing within industrial districts

Proposing and testing an innovative methodology

Ruggero Golini and Albachiara Boffelli

Introduction

The division of labour across specialized co-localized firms is one of the key elements of an industrial district (ID). Under the pressure of globalization and, more specifically, the nesting process of IDs within global value chains (GVCs), such division of labour – with special regard to manufacturing activities – has followed a non-linear evolution and led to greater firm-level heterogeneity within IDs, as increasingly observed by researchers (e.g. Rabelotti et al., 2009; Chiarvesio et al., 2010). To grasp this evolutionary process, this chapter proposes an original methodology to map and analyze production activities and their heterogeneity among firms within an ID. Consequently, we elaborate on the role of manufacturing in industrial districts. However, whereas in Chapter 9 Bettiol et al. analyze the role played by IDs in manufacturing location strategies, we investigate the choices of firms within a district in terms of activities performed and how these affect their competitive position in the global value chain, within the *general aim of understanding the role of manufacturing in supporting the participation of the ID firms in GVCs.*

We present the application and results of this analysis as part of a major survey-based research project conducted by the University of Bergamo across 145 manufacturing firms in the textile and clothing ID of the province of Bergamo (Northern Italy, Lombardy region). This ID has been heavily subjected to that process of fragmentation and globalization which has significantly driven the evolution of firms in other industrial districts (Rabelotti et al., 2009; Chiarvesio et al., 2010; De Marchi and Grandinetti, 2014; Buciuni and Pisano, 2015). Hence, the project aimed to analyze the distribution of manufacturing activities performed by firms in the ID across the different production stages (from spinning to final product manufacturing).

To elaborate, we employed the GVC framework at the ID level to understand which production activities are more common across firms, the extent and forms of vertical integration, and the variety and uniqueness of the activities performed. The starting point is that firms in this region do not exist in isolation, but each one forms part of a local and global supply chain (Belso-Martinez, 2008; Rabelotti et al., 2009; Chiarvesio et al, 2010; De Marchi and Grandinetti, 2014). Moreover, each firm is driven to find an optimal position within its supply chain, which extends outside the ID, and to maintain its role within the ID at the same time. This effort becomes more complicated with each passing day due to globalization, which has caused a great deal of fragmentation and dispersion of production and non-production activities and led to a very intricate global network of supply chain partners (Gereffi, 2005; Gereffi and Fernandez-Stark, 2016). To analyze such a complex context, we employ the GVC framework to understand the nature and content of the linkages between production stages (De Marchi et al., 2013). We rely on the input-output structure of the GVC, which requires the identification of the value chain stages in order to reveal the flow of tangible and intangible goods and services (Gereffi and Fernandez-Stark, 2016).

In conclusion, in this chapter, we propose a methodology aimed at the following: 1) creating a value chain map of the production activities performed at the ID level; 2) analyzing the position of the different firms within this map; and 3) analyzing firm-level heterogeneity, namely, the extent to which firms are involved in different production activities in terms of uniqueness and variety. This contribution is original as we provide a replicable methodology and quantitative indicators for the analysis of IDs through the lens of the GVC framework. It follows that this work attempts to contribute to the GVC literature by presenting a case of extensive activity-level mapping applied to an ID, employing a methodology that could be replicated in future studies and for different IDs.

The Bergamo textile and clothing district

This section will provide an overview of the textile and clothing district in Bergamo, to which the methodology proposed in this chapter has been applied. However, as we will explain later, the same approach could be used to analyze different IDs or industries. The decision to focus on a single industry is in line with the GVC literature, which is often industry-specific; therefore, we could rely on existing works and better control the variables and the context considered. Moreover, the textile and clothing industry has attracted a great deal of interest from GVC scholars (e.g. Appelbaum and Gereffi, 1994; Gereffi, 1994; Gereffi, 1997; Gereffi, 1999; Bair and Gereffi, 2003, Gereffi and Memedovic, 2003; Abecassis-Moedas, 2006; Frederick and Cassil, 2009), because it is one of the world's largest industries and is relevant to almost every country in the world. One additional element that makes this industry so appealing for our research purposes is the turmoil faced in recent decades in terms of the fragmentation and global dispersion of production activities (e.g. Gereffi, 1999).

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The two major disruptions in the textile and clothing industry were the removal of quotas[1] in (2005), which not only increased global competition but also resulted in a global supplier base for the large retailers (Taplin, 2006), and the financial crisis that started in 2008, which hit the textile and clothing industry as a whole and resulted in the textile industry experiencing a more significant decline as a provider of intermediate products (Curran and Zignago, 2010). The direct effects have been the decline in the number of companies and the downsizing of surviving firms, leading to a loss of jobs in the industry. Despite these difficulties, some firms were able to react, and a significant number are still active and profitable (Euratex, 2014). As a result of this trend, China and India became the top two countries in the exports of textile and apparel products. In 2013, China was the world's largest exporter of both textile and apparel products with a global share of 32.6% and 40.1%, respectively, followed by India with shares amounting to 6.3% for textiles and 3.8% for apparels. The third-highest exporter, and the largest within the developed countries, was Italy with shares of 4.1% and 5.3% in the textile and apparel markets, respectively (Sistema Moda Italia, 2016). However, Italy lost 40% of its share in the last 10 years, but it is now recovering through restructuring processes.

In the textile and apparel industry, the province of Bergamo comprised 1,294 registered companies in 2014 (marking a decrease by 1.82% from 2013) and 12,106 employees in 2013 (also having decreased by 12.95% from 2012). The value of exports was €870 million in 2014, indicating an increase of 2.64% from 2013 (Osservatorio Nazionale Distretti Italiani, 2014). Further, two districts were formally recognized in the province: the Bergamasca Valcavallina Oglio and the Valseriana (Osservatorio Nazionale Distretti Italiani, 2014). The characteristics of the districts are summarized in Table 11.1.

The specialization of the Bergamasca Valcavallina Oglio district is split across two sectors: the tailoring of clothing products and dyeing preparation for fur and manufacture of furniture and accessories, the latter not considered in this study. The Valseriana district specializes in textile activities. Most of the companies here are involved in cotton-yarn weaving and tailoring of textile products, except for apparel items, and the manufacturing of moquettes and carpets.

Table 11.1 Overview of the Bergamo cluster in the GVC

	Bergamo Textile and Clothing District	
	Valcavallina Oglio	Valseriana
Products	• Clothing products • Dyeing preparation for fur • Furniture and accessories	• Textiles
ID Position in the GVC	Firms are engaged in production activities (e.g., spinning, weaving, finishing, dyeing, printing, tailoring). Some firms also perform pre-production (e.g., R&D, product design) and post-production activities (e.g., branding and marketing).	
GVC key actors	The textile and clothing GVC is characterized by large Original Brand Manufacturers (e.g. Zara, H&M, GAP), some of them purchase intermediate and finished products from the districts, by relying on quick and flexible suppliers.	
ID Export propensity	€870 million (2014)	
ID # of firms/ employees	1,294 firms in 2014, decreased by 1.82% from 2013 12,106 employees in 2013, decreased by 12.95% from 2012	
ID Local firms	Strong presence of craftsmen (usually stage suppliers or specialized suppliers)	• Small and very small businesses are stage suppliers • Medium-sized companies are specialized suppliers or Original Equipment Manufacturers (OEMs) • A small group of leading firms (usually home-grown) control the innovation dynamic
ID Supporting industries	Machinery production; Chemicals; Logistics; Packaging	
ID Local institutions	Confindustria Bergamo (Textile and Clothing Firms Association)	
ID Major recent transformations	The districts underwent a major restructuring process in recent years. In terms of *products*, the companies moved toward high-quality products (while the medium-quality ones had been outsourced to Eastern European countries). The *population of companies* faced a decline over the last decade, but some of the bigger companies started an integration process driven by the need for greater control of all the manufacturing stages, and these companies eventually became leading companies for the districts.	

Despite the high number of active firms, both districts have faced significant reductions in the number of firms in the last 15 years. This resulted in a concentration process, with few companies (e.g. Cotonificio Albini, Martinelli Ginetto, Carvico) growing by vertical integration and acquisition of smaller suppliers. Such firms are now the backbone of the local district, supporting smaller local suppliers, promoting innovation and engaging with international customers. These *local dynamic actors* are usually Original Brand Manufacturers (OBMs) that rely on a network of specialized suppliers or Original Equipment Manufacturers (OEMs). However, a plethora of small companies has specialized in niches where they have an internationally recognized brand (e.g. Santini, Radici Pietro Industries and Brand), which still provides a fundamental contribution to innovation and brings to the district some sort of resilience to the aforementioned global shifts. Hence, the district followed a hierarchization trajectory, similar to what described in Chapter 4, but did so with many smaller firms that proved adaptable to the changing context (De Marchi and Grandinetti, 2014).

As the two districts are very closely located, they are considered to be within the same ID of Bergamo, and we analyzed them jointly. The research aimed to survey the production activities performed by firms and their connections within and outside the district by using information that is not available from secondary sources, such as economic databases based on NACE[2] codes, which do not take into account the fragmentation of activities or the linkages among firms within the district.

Methodology

This chapter describes the methodological steps followed in our analysis, which can theoretically be applied to map any ID. The steps we followed are described below.

Identification of the value chain stages

The first step aims to define the input-output structure of the GVC within the ID. Several sources can be used, such as the literature, industry reports and preliminary interviews with companies and associations. In our case, we relied on the previous GVC studies in the same industry (Gereffi, 1999; Bair and Gereffi, 2003; Gereffi and Memedovic, 2003; Gereffi and Frederick, 2010; Gereffi and Fernandez-Stark, 2016) and on national industry reports (Sistema Moda Italia, 2016). Additional sources of information were obtained from preliminary interviews with industry experts or with vertical integrated firms belonging to the district.

As shown in Figure 11.1, the textile and clothing value chain comprises three phases:

1 The *raw materials phase* involves the fiber growing/production stage, where the raw materials are grown (in case of natural fibers) or produced (in case of manmade fibers) for textile manufacturing.
2 The *manufacturing phase* involves seven stages: the raw materials pass through the spinning, spinning supplementary activities, weaving preparation activities, weaving and final product manufacturing (namely, the tailoring activities) stages. The finishing stage, which comprises all the activities to ennoble the yarn/fabric, and the printing/dyeing stage can be performed before or after each one of the previously mentioned manufacturing stages; this is why these two stages are represented in parallel to the other stages.
3 The *distribution phase* comprises the retail stage, where the final products are brought to the end consumers.

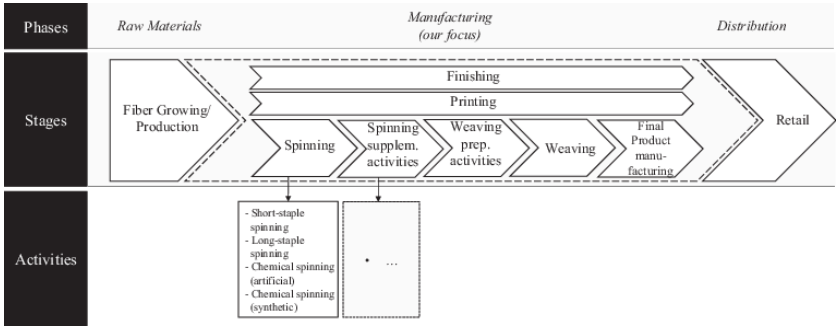


Figure 11.1 Phases, stages and activities in textile and clothing value chain

Note: Activities are reported only for spinning as an example.

Identification of the production activities in each stage

Among the three phases previously described, we decided to focus on the manufacturing activities. In fact, fiber growth and production are not performed in the district, as well as retailing, since the large majority of final products are sold to other companies. Within the manufacturing phase, we identified the *production activities* involved in each of the seven stages described previously.
A preliminary list of activities was defined based on information obtained from technical sources (Fondazione ACIMIT, 2003; Grana, 2005). The list was refined following several interviews with industry experts, leading firms (Gereffi and Fernandez-Stark, 2016) and the most dynamic actors in the district (Rabelotti et al., 2009), since some activities were obsolete and some others were not applicable to the district. At the end of the process, 111 different production activities were identified at different stages of the value chain:

- four spinning activities (e.g. cotton fiber spinning and wool fiber spinning);
- seven spinning supplementary activities (e.g. spooling and twisting);

- three weaving preparation activities (e.g. warping and sizing);
- 10 weaving activities (e.g. weaving with jacquard looms and weaving of non-woven fabrics);
- 31 printing/dyeing activities (e.g. bleaching and digital printing);
- 49 finishing activities (e.g. finishing with softener and antibacterial treatment); and
- seven final product manufacturing activities (e.g. cutting and sewing).

For brevity sake, we do not list all the activities; however, the logic we followed is to consider each activity to be different from the other when it employs a different technology, auxiliary materials or equipment.

Survey design

The next step was to design a survey to gather data on which of the previously identified production activities are performed by the firms in the district. Moreover, we requested some general information about the company that could be used as control variables. The survey we administered had the following structure:

1 General information about the company: characteristics of the company, products offered, final markets and pre- and post-production activities performed;
2 Production activities performed: both stage-level and activity-level, as described in the previous steps of the methodology;
3 Upgrading: the main investments in strategic initiatives related to product, process, functional, chain and environmental and social upgrading;
4 GVC participation indicators: extent of purchases and sales inside and outside the district and the home country (in our case, Italy).

Definition of the population of companies in the district

We derived the initial list of companies from AIDA (a Bureau Van Dijk database, which includes data about limited liability companies) selecting the firms on the basis of the geographic area (Bergamo, in the case of this study) and the industry[3] (textile and clothing). We excluded the codes related to the manufacture of furniture, since it belongs to a different GVC even though it may involve the use of textile products. On the other hand, we included companies classified as distributors as they also perform production activities in many cases. Finally, we conducted some interviews with experts and local industry associations to validate the list of companies and identify the leading companies and their main local suppliers, to ensure that the most prominent firms in the area were included in the sample.

Later, we restricted the number of companies to be contacted based on the availability of economic data in the database and a contact reference (i.e.

telephone number and e-mail). We then eliminated companies belonging to holdings (the parent company was asked to fill the survey for the entire group), small companies (those with less than ten employees) involved only in the distribution phase, and companies that, after a check, resulted as not actually operating in the textile industry. This last activity was completed after having directly contacted the company by e-mail or telephone. In the end, from an initial database of almost 700 companies, we arrived at an available population of 443 companies.

Data collection

To reach out to the companies, we asked the local association of textile companies to distribute the survey across its associates (118 companies). With the remaining firms, we established preliminary telephonic contact in order to ensure an adequate response rate and the quality of the responses. In fact, by contacting the firms by telephone, we obtained the direct e-mail address of the most appropriate persons who could fill the questionnaire (in general, a manager with an overall view of the company or the production or the operations manager). Next, we sent them an e-mail containing a description of the project and instructions on filling the survey. As a reward for completing the survey, we promised the participating companies a customized report. The overall process took place between January and February 2016. In the end, we obtained a response rate of 32.7% with 145 companies completing the questionnaire from the total available population of 443 companies.

Development of the indicators

After having obtained the data on the production stages and activities performed by the companies, we defined the indicators needed to describe the district characteristics. In particular, we looked for indicators that could provide information about firm-level heterogeneity internal to the ID, which is one of the key concerns in the literature on IDs (Molina-Morales and Martinez-Fernández, 2009; Rabelotti et al., 2009; De Marchi and Grandinetti, 2014). The indicators were developed both at the stage-level (e.g. spinning) and the activity-level (e.g. the four production activities within spinning). Therefore, in this work, we use some general indicators that could be potentially applicable to every district and every industry.
Below are the details of the indicators we employed:

- Stage-level indicators (with reference to the stages of the value chain in Figure 11.1):

    1) Number of companies in each production stage;
    2) Vertical integration: the number of production stages performed by a company.

- Activity-level indicators (with reference to the activities in each stage as in Figure 11.1):

    1) Variety: the number of activities performed by a company in each stage;
    2) Uniqueness: the degree to which the activities performed by the company are exclusive or performed by a limited number of other companies.

Results

Following the methodology discussed in the previous paragraphs, we now illustrate the results of its application to the textile and clothing district in Bergamo. Given our focus on manufacturing activities, we excluded from the analysis pure retailers, wholesalers or producers of accessories (e.g. buttons, zippers). Thus, the results relate to only 79 companies, from the sample of 145 respondents, engaged in manufacturing activities. Comparing the population of firms (443), the collected sample (145), and the manufacturing firms considered (79) in terms of turnover and number of employees, both the sample and the group of manufacturing companies considered have fewer micro-sized companies (those with less than 10 employees) and are slightly overrepresented in terms of medium-sized companies. This is due to the difficulty in reaching key respondents in micro-sized companies or their lack of interest/time in participating in a survey. Nevertheless, micro-companies are well represented in our sample, accounting for 27% compared to the 44% in the overall population. Moreover, for the purpose of this study, larger companies can be more interesting as they have been recognized as the key actors in IDs (Rabelotti et al., 2009). Table 11.2 summarizes the distribution in terms of turnover and number of employees in the manufacturing companies, as considered in the data analysis.

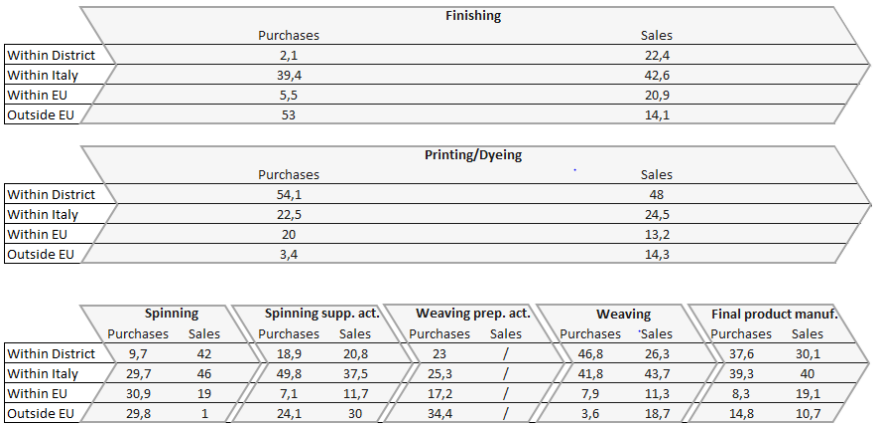
Other interesting descriptive statistics of the sample relate to the location of sales and purchases. Particularly, we have found a strong connection with the district (on average, 31% of purchases and 30% of sales are exchanged with other firms in the district) and, generally, with the home country of the respondents. On average, 69% of the inputs used by the companies come from Italy and 71% of the output is sold in Italy, including within-district exchanges. For the remainder, 13% of inputs are purchased from European suppliers and 18% from suppliers outside the continent. On the other side, 18% of the production is exported to other European countries and 11% outside Europe.

Table 11.2 Turnover and number of employees of the manufacturing companies

Turnover (million €)			Employees		
Range	# of companies	Share	Range	# of companies	Share
0–2	37	47%	1–10	21	27%
2–10	25	32%	10–50	39	49%
10–50	15	19%	50–250	17	22%

Source: Data elaboration from AIDA, a Bureau Van Dijk database. Turnover in € million

In addition, a more detailed analysis at the stage-level has been performed in order to understand the connections with the GVC (Figure 11.2). In terms of purchases, the linkages with global suppliers (i.e. outside EU) are in the upstream stages (spinning or weaving preparation) or in finishing, the latter result being explained by the fact that the chemical products for the finishing activities are usually bought from large multinational companies. In the downstream phases (weaving and final product manufacturing) and printing prevails the linkage with local and domestic suppliers. In terms of sales, the stages with the major global connections are the spinning supplementary activities and finishing, which are the stages mostly performed by OEMs in contract manufacturing.



	Finishing	
	Purchases	Sales
Within District	2,1	22,4
Within Italy	39,4	42,6
Within EU	5,5	20,9
Outside EU	53	14,1

	Printing/Dyeing	
	Purchases	Sales
Within District	54,1	48
Within Italy	22,5	24,5
Within EU	20	13,2
Outside EU	3,4	14,3

	Spinning		Spinning supp. act.		Weaving prep. act.		Weaving		Final product manuf.	
	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales
Within District	9,7	42	18,9	20,8	23	/	46,8	26,3	37,6	30,1
Within Italy	29,7	46	49,8	37,5	25,3	/	41,8	43,7	39,3	40
Within EU	30,9	19	7,1	11,7	17,2	/	7,9	11,3	8,3	19,1
Outside EU	29,8	1	24,1	30	34,4	/	3,6	18,7	14,8	10,7

Figure 11.2 Detail of percentage of sales and purchases by location for each manufacturing stage

Note: In case a firm performs multiple production stages, we considered the first stage for the purchases and the last stage for the sales.

Stage-level analysis

The first analysis focuses on the stages of the value chain to verify whether all the stages are covered within the district and the concentration (i.e. number of companies) in each stage (Figure 11.3). Moreover, the evaluation of the vertical integration and how the companies spread along the value chain provides some preliminary insights on the heterogeneity of firms within the district.

In our sample, we found a greater presence of firms while moving downstream in the value chain. In other words, the spinning, spinning supplementary activities and weaving preparation activities are scarcely represented (accounting for eight, 13 and 14 companies, respectively). On the other end of the spectrum, weaving and final product manufacturing are the most well-represented stages (with more than 20 and 50 companies, respectively). With regard to the major transformations that the district faced in recent years (see Table 11.1), this result can be explained by the fact that the activities abandoned over time in the district are mainly the upstream ones. Further, cross-stage activities (finishing, printing and dyeing) are highly frequent across the sample (more than 20 companies perform such activities). We identified two reasons for this. First, being cross-stage activities, there are higher chances that they are performed in combination with other activities. Second, these activities enable product differentiation, thus providing a significant value-added.

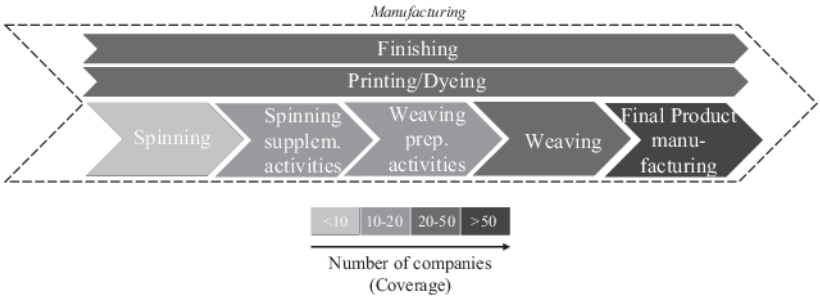


Figure 11.3 Coverage of value chain stages by the manufacturing companies in the sample

Note: one company can be active in more than one stage

Vertical integration, on the other hand, refers to the number of stages performed by a company. We acknowledge that the majority of companies are active in only one stage of the value chain (55.6%). Regarding the other cases, 20.2% of the companies perform two stages; 12.6% three stages; the remaining 1%, four or more stages. Only one company is integrated along the whole value chain. This proves the presence of few broadly integrated companies, which gained a leading role over the years (see the positive correlation between vertical integration and company size presented later), and a great fragmentation among the other firms belonging to the district. Table 11.2 demonstrates the presence of different integration models within the district. In line with the previous analyses, the

majority of the companies are involved in only one stage: 32 are engaged in final product manufacturing, four in printing/dyeing, and two in the remaining stages except for the weaving preparation activities. It is interesting to note, however, that when a company increases its level of vertical integration, it tends to differentiate from the other companies in the district in terms of the stages. Consequently, it is very uncommon to find more than two to three companies with the same integration model (Table 11.3). Moreover, there are cases in which companies skip some intermediate stages, generating integration models that are not continuous along the value chain.

Table 11.3 Integration models of the sample

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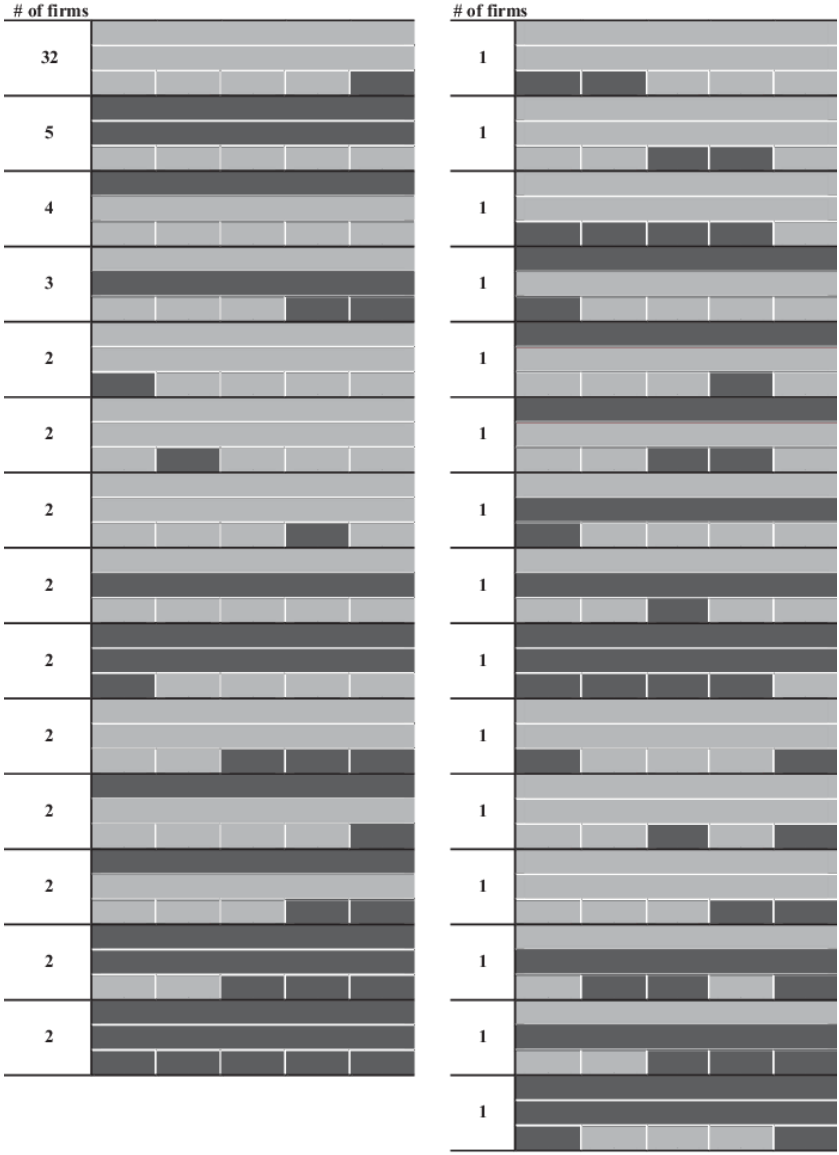

Activity-level analysis

The second analysis goes deeper at the activity level, evaluating the variety of activities performed by a company and their uniqueness with respect to the other companies in the sample. The appendix at the end of the chapter reports the mathematical expressions of the indicators, whereas in this section, we offer an example to explain how to calculate the value of these indicators. Consider a value chain with only two stages. A company can perform a subset of activities for each stage, and so can the other firms in the sample. The *variety* indicator is calculated as the ratio between the sum of all the activities performed by the company and the total number of activities it could have performed within the stages in which it is active. On the other hand, *uniqueness* is the maximum ratio of 1 (if the company performs that activity) and the number of other firms in the sample performing such activity.[4] Table 11.4 reports a numerical example on how to calculate variety and uniqueness.

Table 11.4 An example on how to calculate variety and uniqueness in a two-stages value chain

	Stage 1					Stage 2		
Production stage	Act. 1	Act. 2	Act. 3	Act. 4	Act. 5	Act. 1	Act. 2	Act. 3
Does the company perform the activity?	Yes	No	No	Yes	Yes	No	Yes	Yes
Stage variety	3/5					2/3		
Total variety	5/8							
Number of other firms in the sample performing the activity	4	10	6	8	2	1	10	3
Activity Uniqueness	1/4	-	-	1/8	1/2	-	1 /10	1/3
Total Uniqueness	Max(1/4,1/8,1/2,1/10,1/3)=1/2							

Figure 11.4 displays the distribution of the companies in terms of variety and uniqueness. It can be noted that very few companies demonstrate both high variety and uniqueness, while the majority of the firms fall in the lower left area, which corresponds to low scores for both indicators. Moreover, a group of companies displays very high uniqueness. This indicates a clear firm-level heterogeneity in production activities within the sample.

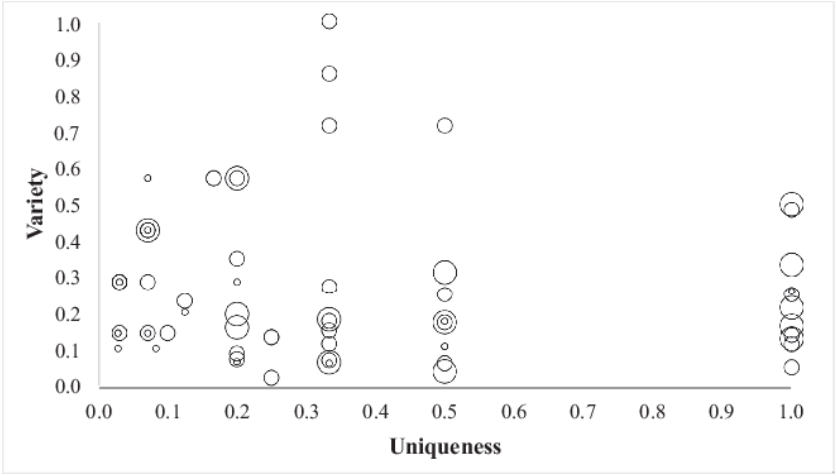

Figure 11.4 Companies distribution in terms of variety and uniqueness

Note: The dimension of the marker reflects the company size: small for micro companies, medium for small companies and big for medium and large companies.

Linking the ID and the GVC level of analysis

We also performed additional analyses, obtained through simple correlations among the different indicators and testing for differences between groups of firms with different characteristics. Examining the correlation among the previously analyzed indicators (vertical integration, variety, and uniqueness) and the company size (measured in terms of the number of employees), we found uniqueness to be positively correlated with both vertical integration and company size, meaning that the bigger the company, the more vertically integrated it is and the more unique are the activities it performs within the district (see Table 11.5). Future developments of this study should investigate if a company's growth was driven by it being characterized by high uniqueness or whether only larger firms could invest in expanding their uniqueness.

Table 11.5 Correlations among the indicators and the company size

	Company size	Vertical Integration	Variety	Uniqueness
Company size	1.00			
Vertical Integration	0.52*	1.00		
Variety	0.15	-0.19	1.00	
Uniqueness	0.36*	0.55*	-0.09	1.00

Interestingly, we did not find evidence of correlation between the activity-level indicators and sales and purchases by location. In other words, companies that are highly unique or those that perform a broad variety of activities are not more

internationalized than the others. Finally, we split the sample between firms involved in the production of a finished product (35 firms) and those that were not (44 firms). We tested for differences on the following variables: vertical integration, variety, uniqueness, distribution of purchases (within the district, within Italy, within Europe and outside Europe) and distribution of sales (within the district, within Italy, within Europe and outside Europe). The last two variables (i.e. distribution of purchases and sales) are measures of backward and forward participation in a GVC, respectively (WTO, 2014; WTO, 2015). As the variables are not normally distributed, we used non-parametric tests (Kruskal-Wallis).

Table 11.6 Kruskal-Wallis test results and mean of the sub-samples of finished products producers and not

Variable		Mean (Not producer of a finished product)	Mean (Producer of a finished product)	Kruskal-Wallis test significance level
Vertical integration		2.1	1.7	0.121
Variety		0.2	0.4	0.000**
Uniqueness		0.5	0.2	0.005**
Purchases	District	48%	41%	0.486
	Italy	67%	71%	0.701
	EU	15%	10%	0.755
	Extra EU	18%	19%	0.839
Sales	District	42%	43%	0.850
	Italy	73%	67%	0.405
	EU	19%	17%	0.844
	Extra EU	8%	16%	0.181
# of companies		44	35	

The analysis highlights that being involved in the production of a finished product influences a firm's variety and uniqueness. Generally, a company that focuses on the production of finished products has higher variety but less unique activities. However, there are no differences in the percentage of purchases and sales in the different locations: the companies are in any case closely linked to the local territory (40% to 50% of purchases and sales are within the district). The results suggest that other factors, besides variety and uniqueness, should be examined in order to explain how well integrated a company is in its GVC.

Discussion

To complement the results of the survey, we interviewed two firms that are among the largest and most successful in the district and have significant participation in GVCs. Via the definitions provided in Chapter 3 by De Marchi et al., we could define these two firms as *local dynamic actors* because of their abilities to innovate, build strong brands and contribute to district growth. Due to our focus on production activities, we used these cases to better understand to what extent their manufacturing strategy – i.e. choices in terms of variety, uniqueness and vertical integration and relationships with local suppliers – contributes to their competitiveness in the GVC.

Company A

Company A was established in 1965 as an artisan factory producing clothes for other companies. After a while, the founder's deep passion for sports, particularly cycling, led them to specialize in clothing for cyclists. One of the distinctive characteristics of the company is their decision to design and manufacture products exclusively in Italy, which also led to the need to develop long-term relationships with local suppliers based on trust and reputation. In 2014, the company recorded €13 million in turnover and an employee count of sixty-three, classifying them as a medium-sized enterprise. Currently, the company manufactures more than 3,000 items every day and exports 70% of its production. The firm is directly involved in research and development (R&D); in fact, it has a team of dedicated designers that develops a new collection yearly and tailors their products to the customers' requests. The speed and efficiency of the new product development process, which also involves the overall supply chain, is one of the competitive advantages of the company. Over the years, the firm has been able to develop a strong and recognizable brand through consistent investments in marketing and branding activities, such as through partnerships with athletes participating in world championships.

Critical success factors are features that allow a firm to succeed in a specific market segment (Brun et al., 2008), and hence, they are strictly related to the firm's competitive strategy. Company A follows a niche strategy focused on product quality, innovation and flexibility.

With respect to the stage-level analysis, Company A is involved in the printing/dyeing and the final product manufacturing stages. Thus, its level of vertical integration is equal to 2. Considering the activity-level analysis, Company A is involved in the following activities:

- Printing/dyeing stage: transfer printing and digital printing;
- Final product manufacturing stage: cutting, sewing, removal of defects and thermal fastening.

Its level of variety of the production activities is 0.16 and its uniqueness is 0.2.[5] As per Figure 11.4, Company A belongs to the group with low variety and

uniqueness in terms of its manufacturing activities. In particular, Company A is not a pure original design manufacturer, but in line with its critical success factors, it keeps some basic manufacturing activities in-house to control quality (e.g. removal of defects) and add high-value customizations (e.g. printing). All the other activities, and especially those with higher uniqueness, are outsourced mainly at local suppliers' (65.8% of the total inputs come from the district). This network of local suppliers supported Company A in the creation of competitive advantage in terms of market responsiveness and development of technical innovations. It appears that this company compensated its scarce variety and uniqueness (well below the district mean) by establishing strong relationships with local partners, to find support for its innovative endeavors and differentiate its own products. In this manner, and thanks to its renowned brand, the company can reach a global market, with 70% of its products being exported all over the world. This company participates in the GVC leveraging uniqueness of local suppliers to conquer global markets, that, according to Caniato et al. (2013), reflects a *Baron* configuration (namely, local purchases, local production and global sales).

Company B

Company B is a well-known family-firm in Valseriana. The family became active in the textile sector in 1891; however, the company was established in 1947, when the first woolen blanket production line was opened. Thereafter, the production was extended by adding cotton and linen as raw materials. The firm has initially focused on the high-end home-textiles market; however, over time it has entered other markets, such as casual wear and furnishings. Company B also began a vertical integration process that allowed to take control over a large part of the value chain. In 2014, Company B recorded a turnover of €75 million and employed 420 workers.

R&D activities are particularly important for this company, both in terms of products and processes. The firm renews its fabrics every year to meet new customer needs, which are gathered by participating in the most important industry fairs and via collaborations with national and international customers. Today, Company B has built strong and recognizable brands in every market niche it targets.

Company B needs to fulfil many critical success factors simultaneously: product quality, craftsmanship and exclusivity, Made in Italy, flexibility, innovativeness and technical characteristics, and, to a lesser extent, sustainability. This reflects the plurality of markets it addresses and the orientation towards high-end niches, which are also highly demanding. Regarding the stage-level analysis, Company B is highly integrated, with involvement in all the value chain stages, except final product manufacturing. Thus, its level of vertical integration is equal to 6.

Per the activity-level analysis, Company B has a variety equal to 0.5 and a uniqueness equal to 1.0.[6] Consequently, both high variety and uniqueness

characterize Company B; in fact, thanks to its broad vertical integration, the firm controls a wide range of manufacturing stages with varying degrees of uniqueness of the activities performed (from low to very high). Differently from Company A, Company B decided to insource uniqueness rather than looking for it at suppliers. As a consequence, connections with local suppliers are less important and Company B exploits the advantages of global sourcing to find the best supply markets (85% of its raw materials and intermediate products are imported from outside Italy). The only exception regards local suppliers of textile machineries, which are involved in R&D projects to develop cutting-edge production technologies. In conclusion, Company B extended its supply chain globally, but kept production local. This configuration allows the firm to add value through its unique and integrated manufacturing processes and serve customers by means of fast and flexible manufacturing cycles.

Although both companies A and B are recognized as leading firms within the district, they have very different features. Company A has low vertical integration, variety and uniqueness, while much higher values of these indicators are registered for Company B. From a strategic perspective, both firms focus on market niches: Company A addresses a single market, while Company B addresses multiple markets, which is reflected by the greater number of production activities and critical success factors that characterize it. Interestingly, Company A has strategic ties with suppliers within the district and takes the final product to global markets, acting as a *gatekeeper* (Morrison, 2008). Conversely, Company B is a global player that has invested in its own manufacturing capabilities and keeps limited ties with other firms in the district. Still, some positive spillovers are generated from the presence of Company B in the district, such as temporary business opportunities and involvement in R&D projects.

Conclusions

In this chapter, we presented a methodology and its application to the textile and clothing ID in the province of Bergamo to map which production activities in the value chain are performed and how companies in the same ID differentiate themselves. To the best of our knowledge, this study represents the first attempt to extensively map the value chain stages and the elementary production activities performed by the companies in an ID. In particular, we propose two new indicators: *variety* (i.e. related to a number of different production activities performed by a company) and *uniqueness* (i.e. related to the extent to which the activities performed are rare in the sample). These indicators, together with vertical integration and the distribution of the different integration models can provide insights on the heterogeneity of firms in an ID in greater detail. Hence, the results contribute to the debate on the heterogeneity of IDs by proving that the Marshallian concept of the ID is undergoing a change.

The application of the methodology on the Bergamo textile and clothing ID shows that companies tend to concentrate in the final stages of the value chain and on

supporting activities. Moreover, a significant number of companies are focused on one or few stages in the value chain, which is in line with the literature (i.e. increasing fragmentation of specialization in the global value chains). However, almost half of the sample comprises companies that are vertically integrated, often in a discontinuous way, and this opens new possibilities for research as vertical integration has usually been considered for stages that immediately precede or follow the current one. The fact that many different integration models have been found highlights one major difference with other studies conducted, for instance, in developing countries where a large portion of the firms' population is concentrated in the same production stage (Gereffi and Frederick, 2010). In addition, the analysis of vertical integration allows the identification of the larger firms within the district, which are often autonomously engaged in the GVCs. This is the case of Company B, which followed a process of vertical integration that included the acquisition of smaller companies to control the entire supply chain. However, as in the case of Company A, leading firms at the ID level can also be those that source locally and act as gatekeepers, with lower levels of vertical integration (Morrison, 2008). In both cases, such *local dynamic actors* find in the ID a source of competitive advantage and, in turn, they foster innovation and establish a connection between the ID and the GVCs.

Such competitive advantage generated in the ID is tightly related to the concepts of variety and uniqueness proposed in our study. The results of our mapping methodology show how the ID includes a broad range of firms with different specialization in terms of production stages and activities performed. Such diversity creates the possibility to configure and reconfigure firms in *temporary local value chains*, which are self-orchestrated or orchestrated by local lead firms to reach global markets. In these chains, each firm contributes thanks to the uniqueness and/or variety of its processes and, as a whole, the ID is able to adapt to changing conditions of the global markets thanks to the heterogeneity of its actors. Such heterogeneity in the production activities is also reflected in the heterogeneity of knowledge possessed and shared by the firms. This makes the ID a very fertile environment for innovation and explains why global buyers engage with firms in the ID at all stages, as the high percentage of sales outside the country at each stage of the value chain demonstrates.

In this complex picture, it is still possible to observe some general trends: for instance, variety and uniqueness alone are not related to a higher or lower participation in a GVC in terms of purchases and sales outside the country – which, from the case studies, seem to be rather related to the presence of R&D and branding activities within the firm. As a consequence, future developments of this work can concentrate on the impact of R&D and branding activities, which is an additional source of firm-level heterogeneity.

In conclusion, the analysis presented in this paper contributes both to the literature on GVC and ID and moves a step forward in reconciling the global-local issue by presenting an objective and quantitative methodology and, therefore, paving the way for a more structured interaction between the two fields. Our conviction is

that such methodology is generalizable to different districts, once the basic activities characterizing the value chain have been identified. Moreover, this mapping effort can be of help for companies in the ID to know their role and contribution in the GVC. In our case, companies from the textile and clothing ID of Bergamo are currently using our data to strengthen their connections and evaluate joint investments on the production activities which can be of mutual interest.

One primary limitation is that the focus is only on production activities and we left out pre- and post- production stages of the value chain. However, our methodology can be easily extended to include such activities. Another limitation of this study is its focus on a single ID. For future developments of this work, a comparison with other IDs mapped using the same methodology would be highly beneficial. In particular, two kinds of strategic comparisons are foreseeable for multiple IDs: on the one hand, the comparison of IDs in the same industry and country and, on the other hand, the comparison of different product IDs in the same region. Moreover, given the scattered situation in terms of vertical integration, variety and uniqueness, more case studies should be developed to establish causal relationships between the different variables. Finally, a dynamic analysis of how companies have evolved over time, for instance, by replicating the study after five years, could also prove important in highlighting how firms in IDs evolve over time.

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Appendix Begins Here

Appendix

The mathematical expressions of the two activity-level indicators are as follows:

i Є I, I set of companies;

j Є J, J set of stages;

k Є K[1,n_j], K set of activities with n_j = maximum number of activities in stage j

$$Variety_i = \frac{\sum_j \sum_k x_{ijk} * j_{ij}}{\sum_j j_{ij} * n_j}$$

$$Uniqueness_i = max\left[Uniqueness_{ijk} \right]$$

$$Uniqueness_{ijk} = \frac{x_{ijk}}{\sum_i x_{ijk}}$$

With $$x_{ijk} = \begin{cases} 1 if\ company\ i\ perform\ activity\ k\ in\ stage\ j \\ 0\ otherwise \end{cases}$$ and

$$j_{ij} = \begin{cases} 1 if\ company\ i\ is\ in\ stage\ j \\ 0\ otherwise \end{cases}$$

Appendix Ends Here

References

Abecassis-Moedas, C. (2006). Integrating design and retail in the clothing value chain: An empirical study of the organisation of design. *International Journal of Operatios & Production Management*, 26(4): 412–428.

Appelbaum, R., and Gereffi, G. (1994). Power and profits in the apparel commodity chain. In E. Bonacich, L. Cheng, N. Chinchilla, N. Hamilton, and P. Ong (eds.), *Global Production: The Apparel Industry in the Pacific Rim.* Philadelphia, PA: Temple University Press, pp. 42–62.

Bair, J., and Gereffi, G. (2003). Upgrading, uneven development, and jobs in the North American apparel industry. *Global Networks*, 3(2): 143–169.

Belso-Martínez, J.A. (2008). Differences in survival strategies among footwear industrial districts: The role of international outsourcing. *European Planning Studies*, 16(9): 1229–1248.

Bettiol, M., Chiarvesio, M., Di Maria, E., and Micelli, S. (2017). Manufacturing, where art thou? Value chain organization and cluster firms' strategies between local and global. In V. De Marchi, E. Di Maria and G. Gereffi (eds.), *Local Clusters in Global Value Chains: Linking Actors and Territories Through Manufacturing and Innovation*. Abingdon: Routledge, Ch. 9.

Brun, A., Caniato, F., Caridi, M., Castelli, C., Miragliotta, G., Ronchi, S., Sianesi, A., Spina, G.. (2008). Logistics and supply chain management in luxury fashion retail: Empirical investigation of Italian firms. *International Journal of Production Economics*, 114(2): 554–570.

Buciuni, G., and Pisano, G.P. (2015). Can Marshall's clusters survive globalization? *Harvard Business School Working Paper*, No. 15-088.

Caniato, F., Golini, R., and Kalchschmidt, M. (2013). The effect of global supply chain configuration on the relationship between supply chain improvement programs and performance. *International Journal of Production Economics*, 143(2): 285–293.

Chiarvesio, M., Di Maria, E., and Micelli, S. (2010). Global value chains and open networks: The case of Italian industrial districts. *European Planning Studies*, 18(3): 333–350.

Curran, L., and Zignago, S. (2010). The financial crisis: Impact on key clothing markets and suppliers. *Journal of Fashion Marketing and Management: An International Journal*, 14(4): 530–545.

De Marchi, V., Di Maria, E., and Micelli, S. (2013). Environmental strategies, upgrading and competitive advantage in global value chains. *Business Strategy and the Environment*, 22: 62–72.

De Marchi, V., Gereffi, G., and Grandinetti, R. (2017). Evolutionary trajectories of industrial districts in global value chains. In V. De Marchi, E. Di Maria and G. Gereffi (eds.), *Local Clusters in Global Value Chains: Linking Actors and Territories Through Manufacturing and Innovation*. Abingdon: Routledge, Ch. 3.

De Marchi, V., and Grandinetti, R. (2014). Industrial districts and the collapse of the Marshallian model: Looking at the Italian experience. *Competition & Change*, 18(1): 70–87.

Euratex. (2014). *Taking Action for the Future of the European Textile and Clothing Industry*. Retrived at: http://euratex.eu/fileadmin/user_upload/images/do_not_miss/Euratex_brochure_2015.pdf

Fondazione ACIMIT. (2003). *Quaderni di tecnologia tessile.* ACIMIT Servizi (eds.)

Frederick, S., and Cassil, N. (2009). Industry clusters and global value chains: Analytical frameworks to study the new world of textiles. *The Journal of the Textile Institute*, 100(8): 668–681.

Gereffi, G. (1994). The organization of buyer-driven global commodity chains: How US retailers shape overseas production networks. In G. Gereffi, Korzeniewicz, M. (eds.), *Commodity Chains and Global Capitalism*. Westport, CT: Praeger, pp. 95–122.

Gereffi, G. (1997). Global shifts, regional response: Can North America meet the full-package challenge? *Bobbin*, 39(3): 16–31.

Gereffi, G. (1999). International trade and industrial upgrading in the apparel commodity chain. *Journal of International Economics*, 48(1): 37–70.

Gereffi, G. (2005). The global economy: Organization, governance and development. In N. J. Smelser and R. Swedberg (eds.), *The Handbook of Economic Sociology*. Princeton: Princeton University Press, pp. 160–182.

Gereffi, G., and Fernandez-Stark, K. (2016). *Global Value Chain Analysis: A Primer*. Durham, North Carolina: Center on Globalization, Governance & Competitiveness (CGGC).

Gereffi, G., and Frederick, S. (2010). The Global Apparel Value Chain, Trade and the Crisis: Challenges and Opportunities for Developing Countries. World Bank Policy Research Working Paper Series.

Gereffi, G., Humphrey, J., Kaplinsky, R., and Sturgeon, T. (2001). Introduction: Globalization, value chains and development. *IDS Bulletin*, 32(3): 1–8.

Gereffi, G., Humphrey, J., and Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, 12: 78–104.

Gereffi, G., and Memedovic, O. (2003). *The Global Apparel Value Chain: What Prospects for Upgrading by Developing Country*. Vienna, Austria: United Nations Industrial Development Organization (UNIDO).

Grana, C. (2005). Tecnologia e merceologia tessile per la formazione degli operatori del settore tessile-abbigliamento. Editrice San Marco. Bergamo, Italy

Molina-Morales, F.X., and Martínez-Fernández, M.T. (2009). Does homogeneity exist within industrial districts? A social capital-based approach. *Papers in Regional Science*, 88(1): 209–229.

Morrison, A. (2008). Gatekeepers of knowledge within industrial districts: Who they are, how they interact. *Regional studies*, 42(6): 817–835.

Osservatorio Nazionale Distretti Italiani. (2014). *Osservatorio Nazionale Distretti Italiani.* Available at: www.osservatoriodistretti.org/node/218/distretto-bergamasca-valcavallina-oglio

Rabellotti, R., Carabelli, A., and Hirsch, G. (2009). Italian industrial districts on the move: Where are they going? *European Planning Studies*, 17(1): 19–41.

Sistema Moda Italia. (2016). *Rapporto di settore 2015/2016. L'industria tessile-moda in Italia. Il quadro generale.* Available at: www.sistemamodaitalia.com/it/area-associati/centro-studi/item/9894-l-industria-tessile-moda-in-italia-rapporto-2015-2016

Taplin, I.M. (2006). Restructuring and reconfiguration: The EU textile and clothing industry adapts to change. *European Business Review*, 18(3): 172–186.

WTO. (2014). *World Trade Report 2014*. Available at: www.wto.org/english/res_e/booksp_e/world_trade_report14_e.pdf

WTO. (2015). *International Trade Statistics 2015*. Available at: www.wto.org/english/res_e/statis_e/its2015_e/its2015_e.pdf

Notes

[1] The Multi-Fiber Arrangement (MFA) and the following Agreement on Textile and Clothing (ATC) restricted exports to the major consuming markets by imposing limits (i.e. quotas) on the volume of imported apparel and textile items. The system was designed to protect the domestic industries of the United Stated and the European Union by limiting imports from highly competitive suppliers such as China.

[2] NACE (Nomenclature statistique des Activités économiques dans la Communauté Européènne) is the statistical classification of economic activities in the European Communities. NACE is a four-digit classification providing the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economics and statistics (e.g. production, employment and national accounts) and in other statistical domains developed within the European statistical system (ESS). NACE Rev. 2, a revised classification, was adopted at the end of (2006), and it began implementation in 2007. (http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_(NACE)).

[3] NACE codes used in this research: 13 and 14 (with all the subsets); 46.16, 46.41, 46.42; 47.51, 47.53, 47.71, 47.82.

[4] We used the maximum to calculate uniqueness for sharper results; however, similar results were obtained using the average (the correlation between maximum and average uniqueness equals 0.820, sig. 0.000).

[5] Company A performs two out of 31 activities in the first stage and four out of seven activities in the second stage, thus the variety score for Company A can be calculated as 6/38 = 0.16. In order to evaluate its uniqueness, it is necessary to count, for each activity in which the company is involved, the number of other firms in the sample that perform the same activity. For example, there are other six companies involved in digital printing, so the uniqueness of this activity can be calculated as 1/6 = 0.167. Accordingly, Company A's uniqueness score is 0.2.

[6] Company B is involved in 52 different activities of the 104 it could perform; namely, the total number of activities of the 6 stages in which it is involved. Therefore, the variety score for Company B is 0.5. This firm is the only one in the sample performing the following activities: chintzing (treating fabric with waxes and resins to give a shiny appearance and a pleasant texture), crease-care treatment, anti-slip treatment and easy-wash treatment. Thus, Company B's uniqueness score is equal to 1.0.