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Dipartimento di Scienze Economiche "Marco Fanno"

INDUSTRIAL DISTRICTS AS OPEN LEARNING SYSTEMS: COMBINING EMERGENT AND DELIBERATE KNOWLEDGE STRUCTURES

FIORENZA BELUSSI
University of Padova

SILVIA RITA SEDITA
University of Pavia

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Fiorenza Belussi

Department of Economics and Management, University of Padova
Via del Santo 33, 35123 Padova, Italy
Telephone: +39 049 827 4051, Fax: +39 049 827 4211
fiorenza.belussi@unipd.it

Silvia Rita Sedita

Department of Economics and Management, University of Padova
Via del Santo 33, 35123 Padova, Italy
Telephone: +39 049 827 4236, Fax: +39 049 827 4211
silvia.sedita@unipd.it

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Abstract

This article deepens the theoretical understanding of learning processes in industrial districts (IDs) by analysing the emergent and deliberate structures that favour knowledge transfer at the local and distance level. An analytical framework illustrates district-learning dynamics through two mechanisms. The first is the exploitation of local knowledge structures. The second is the exploration of distant knowledge structures. We claim that a combination of the two mechanisms enhances the competitiveness of industrial districts in the global arena. We illustrate how these theoretical reflections find empirical evidence in the case of the Lake Naivasha cut-flower district in Kenya.

Key words: industrial districts, knowledge structure, business networks, communities of practice.

JEL codes: R0, O1.

1. INTRODUCTION

This article offers new theoretical insights into the learning processes occurring in industrial districts (IDs) through emergent and deliberate knowledge structures. In the first part of the article, we present an extensive literature review, which begins from the historically rooted concept of the 'industrial district', and the Marshallian idea of knowledge being simply 'in the air', or easily absorbed in an 'industrial atmosphere'. This was the initial conceptualisation of the role of 'localities' and related positive economic externalities, the latter emerging mainly through informal knowledge spillovers among firms that are part of a 'specialised industry'. Localised forms of learning were first identified more than 100 years ago in the writings of Alfred Marshall. The interest in Marshall's contribution has remained surprisingly unchanged. His socioeconomic

approach came up again during the 1990s, and was revalued and adopted both by American business scholars (PORTER, 1998; HARRISON, 1992) and economic geographers (SAXENIAN, 1994; SCOTT, 1988 2006; STORPER, 1995; FELDMAN, 2004). Moreover, in Europe (ASHEIM, 1996; MASKELL, 2001; COOKE, 2002; MASKELL and KEBIR, 2005) and particularly in Italy, a wide discussion has flourished (BECATTINI, 1990; PANICCIA, 1998; BELUSSI and GOTTARDI, 2000; ANTONELLI, 2000) around the topic.

Numerous contributions, adding to the traditional Marshallian framework, have emphasised how district local dynamics are less and less spontaneous and more interwoven with formal mechanisms, the latter involving key local actors (large innovative firms, knowledge-intensive institutions, universities or private and public research laboratories). These new developments have aligned with the reflections provided by the 'cluster literature' which originated from the Porter's contribution in the 1980s (COOKE, 2002; MARKUSSEN, 1996; FELDMAN, 2004, IAMMARINO and MCCANN, 2006), and by theoretical and empirical findings on the evolution of the industrial district model (STORPER and HARRISON, 1991; SCOTT, 1992; ROBERTSON and LANGLOIS, 1995; BELUSSI and GOTTARDI, 2000; LISSONI and PAGANI, 2003; GIULIANI, 2005; LORENZONI, 1990; LORENZONI and ORNATI, 1988; LORENZONI and LIPPARINI, 1999; BOARI and LIPPARINI, 1999; BIGGIERO, 2002). Local knowledge and business networks have been emphasised as specific (and territorialised) *loci* of learning. Considerable empirical studies have been produced, for instance, on the Boston biotech district (SMITH-DOERR and POWELL, 2003), the Brescia mechanical cluster (LISSONI, 2001), and the Chile wine cluster (GIULIANI, 2005).

Our article blends the perspective of the industrial district model as a 'localised learning system' with a novel approach that stresses the conceptualisation of the industrial district as an 'open learning system'. In this new perspective, the act of building external linkages and accessing external innovation sources is crucial in the determination of district performance. We maintain that the district knowledge structure is formed by both an endogenously driven mechanism of learning and a globally driven process of absorption and re-elaboration of external knowledge. Stemming

from the first contribution of AMIN and THRIFT (1992), which evoked the disappearance of 'Marshall nodes' due to the globalisation process, in the literature there is a 'crescendo' of interest on the local-global issue[1].

Considering the importance of external linkages for the evolution of the industrial district model, two research questions are posed:

- What is the role of external distant linkages for enhancing the competitiveness of industrial districts in the global arena?
- Which are the knowledge structures most suited to handling external distant linkages?

Our work elaborates a conceptualisation that is more sophisticated than those produced up to now[2]. Instead of referring only to a binary modality (local and global), our contribution aims to disentangle the complex issue of learning structures by introducing an analytical framework. This illustrates district-learning dynamics as the result of four mechanisms. The first is the exploitation of informal-emergent local knowledge structures. The second is the exploitation of formal-deliberate local knowledge structures. The third is related to the exploration of informal-emergent distant knowledge structures. Finally, the fourth explores formal-deliberate distant knowledge structures. We distinguish between emergent knowledge structures (realised despite or in the absence of intention), such as social networks and communities of practice, and deliberate knowledge structures (realised as intended), such as business networks (transactional relationships with research institutions are included). The Lake Naivasha cut-flower district, located in Kenya, is used as an empirical study to test our analytical framework.

The article is organised as follows. The following two sections provide a synthesis of the literature related to the evolution of the industrial district concept, from a localised to an open learning system. Next, we discuss the new analytical framework that we are proposing. A presentation of findings concerning emergent and deliberate knowledge structures in the Lake Naivasha cut-flower district follows. The paper ends with some conclusive remarks on the implications of our theoretical and empirical analyses.

2. INDUSTRIAL DISTRICTS AS LOCALISED LEARNING SYSTEMS

In recent years, economic geographers, institutional and evolutionary economists and scholars of business organisations have recognised the geographical embeddedness of systems of innovation and the increasing returns and competitive advantage associated with localisation[3] (GERTLER, 1995, 2003; AMIN and COHENDET, 2004; STORPER, 2009). Historically, the discussion about the benefits of industrial agglomeration can be traced back to Marshall.

In *The Principles of Economics*, he described how an agglomeration of small and medium-sized specialised firms (called, for the first time in the history of economics, an industrial district) fosters the development of external economies, and allows the ID to enjoy the same economies of scale that normally benefit large companies (MARSHALL, 1920: IV.IX.25). The agglomeration process favours the concentration of similar industrial activities, and allows for: a) the creation and deployment of a local pool of skilled workers, b) the possibility of sharing investments in new and expensive machineries, and c) the creation of an 'industrial atmosphere' that enhances knowledge spillovers among workers and entrepreneurs (MARSHALL, 1920: IV.X.7). The advantages of industrial agglomeration and spatial proximity, in terms of innovation and learning, have been explored by a number of studies that have investigated: a) spatial clustering and the formation of vertical (along the business value chain) and horizontal (between competitors and institutions) linkages (see Porter, 1998); and b) national (LUNDVALL, 1992; NELSON, 1993) and regional (FLORIDA, 1995; ASHEIM, 1996, 1997; COOKE et al., 1997, COOKE, 1998, BRACZYK, et al., 1998, COOKE, 2002) systems of innovation, which have recognised the 'territorialisation' of a variety of institutions and leading actors (above all firms) to be influential in the process of new knowledge formation and the reinforcement of learning abilities.

The analysis of the geography of knowledge spillovers appears to be another important perspective through which the concept of localised learning has been discussed. For example, the importance of co-localisation or proximity among scientists has been assessed through analyses of

US patent citations (JAFFE et al., 1993; AUDRETSCH, 1998; AUDRETSCH and FELDMAN, 1996; CANIËLS and ROMIJN, 2005). Knowledge spillovers are related to a 'Marshallian district effect', which is strongly linked to the phenomenon of the labour mobility (BRESCHI and MALERBA, 2001) of experts or scientists from universities to firms (ZUCKER et al. 1998).

Recently, MASKELL (2001) redirected attention towards the localised learning phenomenon, which occurs among firms clustered along both the vertical (interactions with clients and suppliers) and horizontal (rivalry and facilitated observation of the most knowledge-intensive competitors) dimensions.

These distinct approaches explicitly (ASHEIM, 1996: industrial districts as learning region) or implicitly (MASKELL, 2001: the industrial districts category as a form of a more general phenomenon: the cluster) share many of the most important Marshallian reflections.

The type of knowledge circulating in the Marshallian district is mainly tacit, rooted in practice and technical. It is more related to know-how (procedural knowledge as opposite to declarative knowledge, or know-what/why knowledge). Often, the degree of codification in firms is very low, and the experience of more skilled workers is passed on to the newer generations through the word-of-mouth mechanism or face-to-face contacts (BECATTINI, 1990: 38). The economic coordination that in the neoclassical paradigm was organised by impersonal calculative transactions is transformed into 'embedded' transactions in the ID model, influenced by social ties, variations of self-built trust, reputation, solidarity, norms, habits and co-evolved rules of conduct. The presence of frequent and eradicated socioeconomic relationships favoured, in the ID model, the rise and sedimentation of what has elsewhere been called social capital (BOURDIEU, 1985; COLEMAN, 1988; PUTNAM, 1993).

ID becomes a living metaphor of an institutional arrangement and mixes the neoclassical view of self-interested agents (local firms) with a more sociological perspective, describing how actors are motivated in their actions by social obligations, as theoretically assumed at a more general level by LYONS and MEHTA (1997) and HOLLINGSWORTH (2000). The main consequence is an institutional

arrangement that reduces transaction costs and improves cooperation and learning among local actors (business firms and institutions). This learning process is facilitated by the existence of communities, associations, and various forms of social networks (BECATTINI, 1990; DEI OTTATI, 1994). The social perspective is characterised by the introduction of the concept of the community as fundamental for the governance of an industrial district[4].

Social networks in IDs are also formed by overlapping communities of practice (CoPs) (LAVE and WENGER, 1991). They are constituted by groups of professionals, informally bound together by a common purpose: to share their distinctive capabilities to solve technical problems. A CoP lasts for a long time and allows for the sedimentation of social capital (LESSER and EVEREST, 2001). The CoP itself can extend beyond the organisation in which the individual is situated, giving rise to networks of communities (BROWN and DUGUID, 1991; 2001) or distributed CoPs (HILDRETH and KIMBLE, 2000); these cross the boundaries of the single community and establish extra-community ties. CoPs diffuse knowledge because they emerge from 'local adaptations of work practices within communities, in response to new problems' (SWAN et al., 2002: 477).

An important criticism of the Marshallian literature refers to the underestimation of significant variation in innovation performances between IDs. Whereas BELLANDI (1992) described IDs as generally characterised by a strong propensity towards incremental innovations ('decentralised creativity'), BELUSSI and PILOTTI (2002) elaborated an analytical framework accounting for district variation (related to their propensity to introduce Schumpeterian innovations). IDs also vary in their ability to generate internal recursive processes of local learning, based on both the accumulation of knowledge and capabilities and the activation of external processes of exploration and exploitation (NELSON and WINTER, 1982; NELSON, 1992; MARCH, 1991).

The literature on localised industrial networks has been supported by many empirical cases (STABER, 2001); however, most of it is more descriptive than analytical. The new toolkits of social network analysis (SMITH DOERR and POWELL, 2003; POWELL W. AND GRODAL, 2005), consisting of detailed descriptions of network structures, have not yet been widely applied. What is missing is a

systematic analysis of the conditions under which certain network structures in IDs lead to innovation (STABER, 2001). The logic-in-use seems to be that the presence of a network indicates cooperation, the latter fostering innovation. However, we know that this causal relationship is profoundly misleading. Subcontracting relations do not always generate new knowledge. Social embeddedness can produce cumulative advantages, but can also lead to 'lock-in' effects. Ties that bind might also become ties that blind (GRABHER, 1993). Embeddedness may produce too much conformity (SORENSEN and AUDIA, 2000) or pathological ossification (LOASBY, 1998). In a study of the garment industry in New York, UZZI (1997) found that performance is not just correlated with the number of ties a firm has (social capital hypothesis), but also with an intermediate number of ties; in other words, a firm's success requires the avoidance of both over-embeddedness and under-embeddedness.

Localised learning is clearly an eclectic phenomenon. Behind the rich literature on 'localised learning', there is a common vision of the advantages of spatial proximity. Spatial proximity creates local externalities (as in the traditional Marshallian framework) and mechanisms of increasing returns á-la-Arthur. The competitiveness of IDs resides in the fact that local firms use complex monitoring strategies to detect knowledge sources (such as cluster-specific architectural knowledge; see PINCH et al. 2003). New knowledge is not instantly dissipated outside the district. While in a global world, the access to resources (and codified knowledge) is basically ubiquitous (MASKELL, 1999), district knowledge, embedded in a local codebook (COWAN and FORAY, 1997, COWAN et al., 1999), is available only to a restricted number of club members. GERTLER (1995, 2003), investigating access to localised tacit knowledge, emphasised the importance of being 'there'. Tacit knowledge is, in fact, commonly perceived as sticky (VON HIPPEL, 1998) and difficult to articulate. It does not flow easily, because it is imperfectly accessible and transferable and, more importantly, exchanged through direct experience, collective support systems, common languages, conventions, habits (STORPER, 1993, 1995) and relational proximity (TORRE and RALLET, 2005).

3. INDUSTRIAL DISTRICTS AS OPEN LEARNING SYSTEMS

Many researchers have emphasised the transition of neo-Marshallian local systems into globalised systems. AMIN and THRIFT (1992) argued that a single location can be connected across different spatial configurations. Globalisation has also reduced the importance of traditional localised production factors (SIMMIE and SENNEN, 1999; KLEEBLE et al. 1999). New knowledge derived by international research collaborations among firms now appears to be of growing importance. Firms are increasingly pushed to scout for knowledge and competencies developed internationally, and are often concentrated in a few territorial innovative 'hot hubs'. Linkages with international customers and clients are therefore crucial to the commercial success of innovative products. Clearly, we are not talking here of the 'death of distance' (CAIRNCROSS, 2001), but rather of the process that forces districts to become 'open learning systems'.

CORÒ and GRANDINETTI (1999) observed that this process affect many Italian districts, where we witness the emergence of a network of stable international subcontractors and strategic suppliers. As discussed by BELUSSI and SEDITA (2010), new forms of distance learning are the novel feature of modern IDs and clusters. International networks of firms and constellations of international social networks and CoPs are initiating a process of exploration, selection, activation and nurturing of knowledge outside the boundaries of the district. This 'opening' process occurs at different levels, and it parallels the tendency of Western companies to increase the share of their foreign research and development (R&D) investments (GERYBADZE and REGER, 1999).

Distance learning is directly linked to the firm's 'absorptive capacity' (COHEN and LEVINTHAL, 1990). With this term, AAGE (2004) addresses the ID's ability to achieve external knowledge. Her study of the clothing ID in Jutland (DK) shows that external information sources are relevant to internal innovative capabilities. In districts, external knowledge is absorbed by local gatekeepers through the activation of a mechanism of searching, transcoding and transferring. Several researchers have related the innovative capability of district firms to their ability to use external

sources of knowledge for innovation (MORRISON, 2008; POWELL et al. 1996; MOODYSSON et al. 2008; ZUCKER et al., 1998). Empirical research on knowledge and firm dynamics demonstrates a dual local-global logic of localisation and knowledge flows around nodes of excellence, interconnected by global networks (FELDMAN, 2004; COOKE, 2004).

SAXENIAN (1999; 2005) stressed the important role of skilled immigrants in the development of Silicon Valley. Similarly, the software district of Bangalore in India has been developed by the repatriation of emigrants. Transnational social networks, which subsequently become business networks, build a mutually beneficial connection between transnational technical communities, thus favouring the circulation of people, capital, technologies and ideas (COE and BUNNELL, 2003). Again, ANDERSEN and LORENZEN (2007) reported the case of some Danish entrepreneurs who came back from Boston to start a new firm in Medicon Valley (near Copenhagen), where there is a vital biotech district. They maintained the relationships previously established with the Boston biotech environment, acting as bridges between the two areas. In many Far East countries, high-tech districts developed thanks to the transfer of knowledge facilitated by the localisation of global multinationals or international suppliers, which slowly upgraded local firms' capabilities. Considering the issue of the international circulation of human capital, it is also important to recall here the interesting evolution of the Hsinchu area in Taiwan, supported by the relocation of Taiwanese-American companies that moved their headquarters to Taiwan in order to tap into the huge reservoir of financial and human capital on the island, as discussed by HSU (2003).

It is therefore important to stress the increasing role played by international social networks and international CoPs in supporting learning activities in districts, clusters and regional innovation systems (TEIGLAND, 2006; MASON et al., 2006; STEINER and HARTMANN, 2006).

The recent 'openness' of IDs, including those specialising in low-tech sectors, has recently been remarked on by some economists in relation to the NIC (Newly Industrialised Countries) (HUMPHREY and SCHMITZ, 2002; GIULIANI et al., 2005). As illustrated by GEREFFI and BAIR (2001) and GEREFFI et al. (2005), the relationships with foreign partners, including external suppliers,

customers and research and marketing institutes, have significantly improved the local capabilities of ID firms in developing countries. Recently, BATHELT ET AL. (2004) introduced the concept of global pipelines, pinpointing the duality that characterises the process of local learning. They juxtaposed the local 'buzz' phenomenon with the 'global pipelines' process, maintaining that learning at the local level in districts tends to occur through face-to-face relationships, while outside the district, and at the international level, it is more of an 'organised process', involving contractual relationships among firms. Our analytical framework deviates slightly from this perspective. In our view, localised and distant learning is fuelled by a wider variety of knowledge structures, including local and international communities of practices, internal and external business connections, local and global social networks (AMIN and COHENDET, 2004; GERTLER, 2003).

In the next section, we propose a new analytical framework, rooted in the Marshallian perspective, where the role of international communities of practice and social networks are considered. In modern IDs, as discussed by SAXENIAN (1994), BELLANDI (1992), GIULIANI (2005), GIULIANI and BELL (2005), HÅKANSON and SNEHOTA (1995) and IAMMARINO and MCCANN (2006), communities are formed by specific segments of labour markets, technicians, entrepreneurs and professionals, which form cognitive subsets. These sub-communities are mobile and international. Professionals and skilled workers upgrade their knowledge and interpret the novelties that appear globally on the market. They apply peer evaluation during the selection of new knowledge and foster a mechanism of social validation. In this vein, BENNER (2003) has contributed to the theoretical debate on localised learning by showing how CoPs in Silicon Valley, supported by local institutions, play a significant role in spurring individual and collective learning processes in the region, but in an international context. IDs are characterised by a knitted structure of interactions between entrepreneurs, workers and institutions, favoured by shared work and non-work activities, geographical and social proximity (which underlies the process of CoP formation). As argued in the sociological literature, CoPs can generate knowledge and nurture the local community (see

WENGER, 1998; BROWN and DUGUID, 1991; SWANN et al. 2002), but those developed locally are often interwoven with a constellation of distant CoPs (WARD, 2000).

4. A PROPOSED ANALYTICAL FRAMEWORK

In our new analytical perspective, the ID learning process, which potentially leads to an innovative output, can be decomposed into its main determinants (STEINER and HARTMANN, 2006), as follows:

- Emergent structures, built on informal ties between individuals at the local/global interpersonal level, which are informal learning systems;
- Deliberate structures, based on ties between firms and institutions at the local/global inter-organisational/meso-level, which are planned participative learning systems.

There might be influences, of course, between one type of structure and the other, giving rise to multiple patterns of co-development, as it is well spelled out by CHETTY and AGNDAL (2008). Often, emergent structures are nested in deliberate structures, and their formation is unpredictable, due to a complex process of co-evolution of individual linkages (informal networks). Emergence is, in fact, a novel or unpredictable property in a system (HOLLAND, 1988). Individuals are the main actors in the emergent knowledge structure, which is activated by non-purposeful linkages between subcomponents of the deliberate knowledge structure within a socioeconomic system (HOLLING, 2001). Trade fairs, for instance, are clearly a deliberate structure, because people's participation is planned in advance and the main objective is to acquire important market information. Nevertheless, participants can engage in informal contacts through networking which give rise to emergent knowledge structures. Some authors have defined this process as knowledge sharing in temporary clusters (MASKELL et al. 2006), transient clusters (BELUSSI et al. 2007), temporary agglomerations (NORCLIFFE and REDANCE, 2003) or networks (ROSSON and SERINGHAUS, 1995).

Innovations in IDs are internally supported by firms' strategies and proactive efforts (realised within R&D and engineering departments, focused working groups, and so on). They also result from firms' employees or entrepreneurs' spontaneous activity by means of participation in emergent social networks and CoPs. Moreover, innovative activity can also be the result of inclusion in local and international business networks (where contacts with suppliers, customers, universities and institutions, operating at the local level or situated outside the district, bring new knowledge and many opportunities for innovation[5]). In some cases, business networks are wholly internationalised, as in the case of the global supply chains reported by GEREFFI and BAIR (2001) and GEREFFI et al. (2005). IDs typically follow a model of 'open innovation' (CHESBROUGH, 2003; LANGLOIS and ROBERTSON, 1992; LANGLOIS, 2003), which combines localised and distance learning. Our analytical framework is built upon two principal components, and is displayed in Fig. 1.

The first component is the geography of ties, which refers to the geographical scale of relationships occurring among district organisations and between district firms and external-to-the-district agents. We have therefore emphasised the distinction between local and long distance ties.

The second component is the calculativeness dimension of ties, which illustrates how much the relationships, involving individuals, firms or local institutions, are purpose-oriented. Calculativeness is the glue that keeps business partners together, and it is opposed to trust-based relationships, as discussed extensively by WILLIAMSON (1993). Along this line of reasoning, we distinguished between emergent and deliberate knowledge structures. Low or high levels of calculativeness result in emergent or deliberate structures, respectively. Informal individual networks are simpler to establish, while the formation and governance of organisational networks is more complex and therefore must be planned in advance (TORRE, 2008).

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The intersection between the calculativeness and the geography of ties generates four potential learning situations (A, B, C and D). Two of them are related to the concept of localised learning (A and C), whereas the other two are more related to the concept of distance learning (B and D).

Localised learning fuelled by informal ties (low calculativeness and local ties—quadrant A) requires an active CoP which is able to generate knowledge and nurture district firms, as described by BROWN and DUGUID (1991) and SWANN et al. (2002). Knowledge is spread in social networks and communities, where agents share similar work activities and goals. They enjoy informal meetings and often share both work and leisure time (see also SCOTT, 2006; SAXENIAN, 1994). These interactions among entrepreneurs, professionals, administrators and technicians can easily coexist. However, this type of learning is often not conducive to radical innovation (AMIN and ROBERTS, 2006). These social interactions are somewhat innovative, but still essentially conservative (PORAC et al., 1989).

Distance learning rooted in informal ties (low calculativeness and external ties—quadrant B) takes place within global social networks or networks of CoPs, in informal relationships (WARD, 2000). Connecting with boundary spanners members or participating in global events is an activity that works as a knowledge bridge between local and global actors. Typically, participation in international meetings, conferences and trade fairs allows access to this modality of knowledge acquisition. WENGER (1998: 113) describes these types of meeting as 'boundary encounters', 'single or discrete events that provide connections'. In addition, business travel or visits to the headquarters or other subsidiaries of a multinational corporation (MNC) are means of activating distance learning which, although been planned, leads to unpredictable knowledge spillovers. In the language of the CoP literature, this practice can be referred to as 'opening a periphery' (WENGER, 1998: 117) because it allows members of a local CoP to engage in temporary peripheral experiences. Linkages with distant social networks or communities are likelier to bring more radical innovative views into the organisation.

The localised learning activated by local business networks or R&D collaborations (internal to the district) is driven by deliberate forms of interactions (high calculativeness and local ties—quadrant C). These ties represent a fundamental learning dimension among ID firms. Decentralisation favours the entry of several firms into the industrial structure of an ID, including subcontractors, specialised suppliers and final firms. These local actors participate in the coordination of the production cycle. Innovative subcontractors or suppliers spread innovation within the various components of a district value chain. Business networks can be viewed as relational forms of governance (HÅKANSSON and SNEHOTA, 1995) with more or less dispersed authority, where separate resources are deployed conjointly in a cooperative modality (THORELLI, 1986; STORPER and HARRISON, 1991. They are not just a form of local[6] social connectedness (BRUSCO, 1982; YOU, and WILKINSON, 1994; rather, they also retain some typical characteristics (POWELL, 1990; KOGUT, 2000) of market functioning (flexibility) while reducing the costs of the hierarchy (internal coordination costs)[7]. The functioning of local business networks is enforced by the presence of district institutions. Local institutions emerge from repeated games of agent interactions as rules, social norms, reputation, fair behaviour and trust (DEI OTTATI, 1994). They also represent collective organisations, which respond to specific needs expressed by local agents in terms of training institutions, research centres and local public institutions, and in turn foster local circuits of knowledge and firm cooperation.

Distance learning also occurs through deliberate business and R&D interactions with distant partners (high calculativeness and external ties—quadrant D). In a period of fragmented but integrated global production processes, the construction of global supply chains (BELUSSI and SAMMARRA, 2010; GEREFFI et al., 2005) has gained ground, both as buyer-driven chains (ruled by retailers and large commercial buyers) and producer-driven chains (MNCs). International inter-firm alliances are boosted by the reach of cost-efficiency and access to complementary competences. District firms need to be connected to highly qualified research partners (including leading foreign

institutions and research centres) and/or low cost suppliers to compete internationally and avoid the threat of firms from emerging countries (China, India and Brazil).

Summing up, our analytical framework illustrates the complex variety of knowledge structures which support the ID learning process. We underlined the importance of both emergent structures - built on informal ties between individuals at the local/global interpersonal level, which are informal learning systems - and deliberate structures - based on ties between firms and institutions at the local/global inter-organisational/meso-level, which are planned participative learning systems. The combination of the two mechanisms enhances the competitiveness of industrial districts in the global arena. The following case of the Lake Naivasha cut-flower district in Keynia is the empirical context where our analytical framework is tested.

5. THE LAKE NAIVASHA CUT-FLOWER DISTRICT: A BRIEF DESCRIPTION

In this section, we briefly describe the Lake Naivasha district, and its impressive dominance on the international market. In recent years, new flower producers in regions with comparative advantages in climate and labour costs, particularly Israel, Colombia and Kenya, have challenged the historical dominance of North America, Europe and Japan as producers of floricultural products. The world trade in cut flowers and foliage is nearly $4.5 billion per year. Today, Kenya produces approximately $200 million worth of cut flowers and foliage annually (about 5% of all world trade), nearly all of it exported, with 94% of the exports going to the European Union. Kenya is now the largest exporter to Europe, with about 25% of the market share (WHITEAKER and KOLAVALLI, 2006).

The Lake Naivasha cut-flower district is situated about 100 km northwest of Nairobi, in the Great Rift Valley, at an altitude of 1,800–2,000 m above sea level, and comprises an area of 2,000 ha that includes the municipalities of Naivasha, Thika, Kiambu/Limuru, Nairobi, Nakuru, Nakuru, Nanyuki/Nyahururu, Eldoret and the Mt. Kenya region. About 50–70 % of Kenya's total cut-flower production is concentrated around Lake Naivasha (BOLO, 2006; 2008), and involves about 150

horticultural firms. In this area, the soils, fresh water resources for irrigation and climate are very favourable for horticultural and especially cut flower production. Furthermore, the Nakuru highway allows for transportation from Lake Naivasha to Nairobi and from here to the rest of the world (but mainly to The Netherlands, as we explain below), thanks to the presence of the major hub in the Eastern African region: the Jomo Kenyatta International Airport.

In the 1970s, the principal cultivation in Kenya was fruit and vegetables for local consumption and export; the region also specialised in the production of coffee beans, whose prices in the international market collapsed during 1980s. In that period, some local entrepreneurs decided to search for new profitable businesses; they entered into cut-flower production, and subsequently into market for the cut roses (1990s). Nowadays, mainly cut roses and carnations are produced. What in the past was a limited production for both local and foreign investors is now a flourishing business, which characterised and specialised the entire area of the centre of Kenya from Nairobi to the Lake Naivasha. Cut-flower production started in Limuru where, initially, there were uncultivated local summer flowers growing. The oldest local farms (Oserian, Homegrown and Sulmac), were founded during the 1970s. Some years ago, Flamingo Holdings (the present parent company of Homegrown) acquired Sulmac, which today operates the farm under its new name, Kingfisher.

Over time, Oserian and Homegrown built strong relationships with The Netherlands and the UK, respectively. They became leading multinational firms, forming two large groups with headquarters located outside the home country (Mavuno Group and Flamingo Holdings). They coupled the natural resources of Kenya with their dynamic capability to adopt and improve the most advanced technologies in US and European universities. They also embraced ‘socially responsible’ methods of production to satisfy the demand of the European market for top-quality goods.

Oserian was established in 1969 in Kenya as a vegetable growing farm, with a 5-hectare area of production and a workforce of six employees. Oserian commenced cut-flower production in 1982, initially with statice, and was later one of the first flower farms to start commercial rose production. The flower-growing industry in Kenya has since flourished and has developed beyond all

expectations. Oserian today, with over 20 years of strong growth, is a 'leader in its field' and the largest multi-crop farm in Kenya; it employs 6,000 people and has 225 hectares of production. It generates the highest quality products, with key crops of roses, spray and standard carnations, statice, lisianthus and gypsophila. It is particularly concerned with environmental conservation, combining geothermal and solar energy and advanced farming techniques in its operations. Oserian is also committed to social and ethical employment practices.

The Mavuno Group, established by the founder of Oserian, is a conglomerate of companies incorporating several activities in the areas of flower breeding, propagation, production, marketing and logistics. With a company history stretching back more than 30 years in production, sourcing, supply and trade in the global fresh flower industry, Mavuno provides an integrated supply chain from the grower to all market segments and customers worldwide through seven companies, and trades in over 60 countries. The Mavuno Group has combined Kenya's Oserian with several firms, particularly: East African Flowers (EAF), a Dutch importer of flowers; Tele Flower Auction (TFA), a private Netherland-based online auction house; Fast Truck Flowers, a British company that supplies flowers to florists in the UK; Bloom, in The Netherlands, which provides direct marketing services for Oserian's consumer-ready products on the European market; World Flowers, the UK's largest importer of cut flowers to retail multiples, wholesalers, specialist florists, the e-commerce industry and direct to consumers; and Airflo, a Kenyan freight carrier through which Oserian ships 400 million cut flowers per annum with two flights a day, one to the UK and one to Holland. Daily shipments head straight to Tesco, Sainsbury's, Marks & Spencer and other outlets.

Homegrown, founded in 1982 by Dicky Evans, currently has approximately 6,000 employees in Kenya and accounts for more than 15% of Kenya's horticultural exports. The company specialises in high-quality premium and prepared vegetables and cut flowers, and is a major supplier to most of the leading UK supermarkets. Homegrown mainly uses hydroponic[8] technology and all irrigation is controlled by computer. Flamingo Holdings, whose chief executive is Dicky Evans, combined

Kenya's Homegrown Ltd. with three UK firms: Flamingo UK, a horticultural packaging and distribution company, and Flower Plus and Zwetsloots, leading purveyors of horticultural products. Kenyan and South African flowers are combined with stems from all over the world to provide a million bouquets a week for Marks & Spencer, Tesco, Morrisons and The Co-op.

The rapid growth of the cut-flower industry, due to huge investments in logistics and innovations in technology by the leading companies, allowed Kenya to overtake Israel and Columbia as leading exporters of cut flowers in 2007. The Lake Naivasha district currently employs about 25,000 people, contributing KES 11 billion to the local economy in the form of wages, local taxes and spending on the acquisition of inputs.

The cut-flower industry value chain is composed by firms specialised in breeding, propagation, growing and distribution, as illustrated in Fig. 2.

INSERT FIG.2 ABOUT HERE

The majority of farms in the Lake Naivasha district are small and medium-sized growers[9], covering a protected production area of 2–20 ha (mostly roses), and mainly sell their products directly through the Dutch auction system[10]. They account for 20–30% of exports. Some other small producers (mostly employing family labour), the majority of them members of cooperatives[11], cultivate 0.25–2 ha of open field crops (particularly summer flowers), and sell their product to exporters, who, in turn, make use of the auction system. This category accounts for 5–10% of exports. A few large multi-crop farms (roses, carnations, open field flowers), as already mentioned, owned by both expatriates and so called 'white Kenyans'[12], count more than 20 ha. These multinationals are vertically integrated; they control a global value chain that spans from R&D-based activities to selling, through different distribution channels (from the Dutch auction system to direct sales to supermarkets). They account for 70–80% of exports.

Other important players in the Lake Naivasha district are the 'biocontrol' R&D firms, the exporters, propagators and universities that offer training in horticulture/floriculture and the local and national institutions, such as the Kenya Flower Council (KFC), the Fresh Produce Exporters Association in Kenya (FPEAK), the Horticultural Ethical Business Initiative (HEBI), the Lake Naivasha Growers Group (LNGG), the Lake Naivasha Riparian Association (LNRA) and the Kenya Bureau of Standards (KEBS).

6. METHODOLOGY

Given our interest in detecting the presence of different types of knowledge structures in the district, we organised an empirical survey focused on the Lake Naivasha area. A 'multiple case studies' methodology (YIN, 1989; EISENHARDT, 1989), relying on theoretical sampling, allows us to address our research questions. Following Pettigrew (1990), we chose polar types of firms, in which the process of interest is 'transparently observable'. Qualitative data collection is conducted through face-to-face in-depth interviews (one hour long on average). We used multiple investigators (EISENHARDT, 1989) to build confidence in the findings and increase the likelihood of unexpected findings. The strategy adopted was to make visits to case study sites in a two-person team (e.g., Pettigrew, 1990). This allows the case to be viewed from the different perspectives of more than one observer. Moreover, individuals on the team had unique rotating roles, with one researcher handling the interview questions and the other recording notes and observations (e.g., EISENHARDT and BOURGEOIS, 1988). The interviewer engaged in personal interaction with the informant, while the note taker was able to maintain a different, more distant view.

The Lake Naivasha cut-flower district was our unit of analysis. In the period 26–30 November 2007, CEOs, managers and other leaders of 14 sampled companies and 2 main local institutions were interviewed by the authors[13]. Thanks to the aid of the KFC, we were able to select a sample of firms, which were chosen following the double criterion of size and position in the value chain.

Thus, the firms studied are engaged in the activities of propagation, biocontrol, growing and exporting. There was more than one respondent from some of these organisations.

7. KNOWLEDGE STRUCTURES IN THE CUT-FLOWER DISTRICT

Throughout our interviews, we tried to map the multiple knowledge structures in place in the Lake Naivasha cut-flower district, where firms are engaged in a variety of relationships, both informal and formal, with local and distant partners or institutions. Table 1 summarises the information collected during 2007 through interviews with the district firms' managers or owners.

INSERT TAB.1 ABOUT HERE

7.1 EMERGENT KNOWLEDGE STRUCTURES FOR LOCALISED LEARNING

Emergent knowledge structures are preferred by medium-sized growers, propagators, biocontrol firms and the large corporations more attached to the territory. Informal knowledge exchange at the local level occurs between the firms and local experts, and mainly involves phytosanitary issues. Moreover, some companies which shared the same problems and the need to solve them collectively, decided to formalise their relationships and form a group: the Lake Naivasha Growers Group (LNGG). This was founded in 1996 by a small group of large commercial flower growers, and thereby possessed considerable influence and unofficial power. The membership fee paid by local firms was based on the number of employees. LNGG's initial purpose was to respond to possible conflicts emerging from the environmental criticisms by LNRA; it became a CoP of people meeting weekly to discuss technical problems related to production, legal issues, conservation measures, pest control and irrigation. LNGG especially emphasises pesticide policy, and has introduced environmentally friendly technologies. Actually, hydroponics (see footnote 10) and integrated pest management (IPM) are becoming the standard for growers belonging to the group.

Interestingly, however, although the issue of labour mobility is considered an important tool for knowledge transfer in industrial districts (FORNAHL et al., 2004), only one firm has proposed this modality.

7.2 DELIBERATE KNOWLEDGE STRUCTURES FOR LOCALISED LEARNING

Local and national institutions, not surprisingly, have played a very important role in the learning process of the Lake Naivasha cut-flower district. Networking with institutions and other specialised firms provides district firms with new information to improve the quality of their production and their performance in the commercial sphere. This is particularly true for small and medium-sized growers; large corporations often rely more on the knowledge provided by their extra-district partners and R&D collaborations, or their own distribution channels.

One of the main problems related to the cut-flower industry is how to handle plant diseases. In the district, special attention is given to biocontrol systems. Dudutech in Naivasha and Real IPM in Thika are working on biological control systems to reduce the use of toxic chemicals in the horticulture/floricultural business sector. The four biggest problems in cut-flower growing operations are pests: thrips, red spider mites, root knot nematodes and leaf miners. These two R&D companies are searching for new methods to deal with these problems, and are looking for beneficial insects that can counteract the pests. They are promoting IPM [14], which is also the name of one of the companies involved (Real IPM). To date, red spider mite reduction major success; this post was previously controlled with toxic acaracides. The linkages between the growers and the biocontrol companies are crucial, since in the European market, environmentally friendly production is an asset. The growers are involved in co-development activities with the two labs. Another important source of knowledge in this field is the African Insect Science for Food and Health (ICIPE), which is engaged in 'tropical insect science for development'. Together with its partners, ICIPE searches for and develops environmentally safe integrated pest and vector

management options that avoid pesticides and synthetic chemicals wherever possible. District farms also consult the Kenya Plant Health Inspectorate Service (KPHI), which is a regulatory agency that provides an effective and efficient science-based certification service for the quality assurance of agricultural inputs and products from Kenya, thereby promoting sustainable economic growth and development.

Small and medium-sized growers engage in information exchange with the Fresh Produce Exporters Association of Kenya (FPEAK). Founded in 1975, this association is dedicated to the welfare and enhancement of members' business activities through lobbying, information and marketing support and promotion of members' compliance to international standards. In addition, the KFC, which is a private voluntary association of independent growers and exporters of cut flowers and ornamentals, was recognised by respondents as a lead organisation in promoting self-regulation, lobbying and providing promotional services for the floriculture industry in Kenya. The KFC was established in 1996 with the purpose of bringing together independent growers and exporters of cut flowers and ornamental horticulture products in Kenya. The organisation provides a common platform for these growers and exporters and ensures the implementation of acceptable local and international standards. As of January 2009[15], the council had a total regular membership of 61 flower-growing and exporting companies that owned 70 farms throughout the country. In this year, KFC members represented about 50–60% of the flowers exported from Kenya. Associate membership stands at 25 members, representing major cut-flower auctions and distributors in the UK, Holland, Switzerland, Germany and Kenya. Associate members are involved in the flower sector through flower imports, provision of farm inputs and other related services. Efforts are underway to harmonise the activities of FPEAK and the KFC under the umbrella of the Kenya Horticultural Council (KHC).

Information related to export activities is provided by the Export Promotion Council (EPC), which is Kenya's premier institution in the development and promotion of export trade. Established

in 1992, EPC's primary objective was to address the bottlenecks that exporters and producers of export goods and services were facing, with a view to improving the performance of the export sector. The EPC was therefore established to give an outward orientation to an economy that had hitherto been inward looking. Today, the EPC is the focal point for export development and promotional activities in the country.

The Horticultural Crops Development Authority (HCDA) is a state corporation under the Ministry of Agriculture. Founded in 1967, the HCDA is vested with the responsibility of developing, promoting, coordinating and facilitating the horticultural industry in Kenya. Through different departments, it provides firms with information on technical issues, marketing and strategic planning, finance and human resources administration. Small growers particularly rely on this institution, which offers them (at a cost) a chain of pre-cooling facilities, dry vans and insulated trucks for transportation, central cold rooms and pack houses for sorting and grading in Nairobi. The leading companies have their own logistics systems and are totally independent of the HCDA.

Training courses at the local level are conducted by international non-profit associations, such as Africa Now[16], which also provides financial support for small holders. Universities are not counted as important sources of information for learning; the absence of formal collaboration programmes between district firms and Nairobi universities constitutes a major lack. There are some bachelor and master's courses for agronomists but, concerning the management and governance of enterprises and the global value chains, scant attention is given to the study of possible trajectories for the sustainable development of the local economy. The environmental issues are held to be more important than the private interests of the local companies. The kind of knowledge that is most difficult for Kenyan firms to acquire is access to accurate and timely information about the major overseas markets. The largest firms have developed mechanisms for maintaining effective access to market information, particularly using their vertically integrated structures localised abroad and long-term relationships with buyers and importers. Moreover, the absorptive capacity of the largest

farms is enhanced by the research activities conducted in-house or within sister companies located in Kenya. Medium-sized growers look for problem-solving knowledge within their business network, establishing fruitful collaborations with suppliers of weed killers, fertilisers, plastic materials and substratum. Small growers face much more significant barriers.

The participation in trade fairs is generally considered an important aspect of knowledge transfer and circulation through deliberate structures. As shown in Table 1, nearly all firms declare that they attend these events.

7.3 EMERGENT KNOWLEDGE STRUCTURES FOR DISTANCE LEARNING

Business travel, conferences and trade fairs worldwide (but mainly in The Netherland) are activities which work as boundary encounters (WENGER, 1998), giving companies an opportunity to extend their knowledge base and to interweave this with competences which are not available in the district. The nature of the knowledge exchanged is prevalently tacit, embodied in the people who move (POLANY, 1958); therefore, these activities fuel a global buzz, which is not always combined with formal business and/or research agreements. Almost all the people interviewed mentioned participating in international trade fairs. Only small producers are at disadvantage in this regard, because they cannot sustain the costs. In this section, we have included participation in trade fairs as part of the emergent knowledge structure, due to the informal contacts that firms' managers can establish in parallel to their deliberate strategy of taking part to trade fairs.

Informal contacts with experts worldwide are particularly relevant for R&D activities, such as the IPM. The biocontrol firm we interviewed relies mostly on emergent knowledge structures to gather important information and knowledge. Scientists working for biocontrol firms are, in fact, members of epistemic communities and CoPs worldwide. They often participate in scientific conferences and work as boundary spanners, bringing new knowledge to the district. This is beneficial for the firms which establish formal or informal relationships with them at the local level.

7.4 DELIBERATE KNOWLEDGE STRUCTURES FOR DISTANCE LEARNING

Growers located in Kenya are engaged in strong business agreements with breeders and R&D labs that are mainly located in Holland, in order to guarantee the production of a large variety of roses (in terms of colour, size and scent) and improve the quality and durability of cut flowers. Some companies rely on the R&D activities of sister companies in the UK and Holland. One of the sample farms reported research collaboration with Bonn University in Austria, where testing for disease is carried out on a weekly basis, and having cultivated linkages with other components of the value chain that are also located in Austria. Another company is in contact with two scientists at the University of Florida, academics David Clark and Harry Klee, who are genetically modifying roses by injecting them with genes from tomatoes and petunias, and hope to license the resulting technology. This is because one of the company's main UK customers, Sainsbury's, wants flowers that smell sweet and last longer.

Many medium-sized and large growers rely on technical knowledge from Israel about greenhouse building and maintenance. Invented by the Dutch for the cooler climes in Northern Europe, the greenhouse has been adapted by Israel for use in arid regions. Israeli researchers at the Volcanic Center of the Ministry of Agriculture have developed, for instance, a new sensor that gauges moisture levels in plants and trees, and issues real-time alerts to farmers' mobile phones or computers when watering is required. The sensor device, shaped like a hammer, is embedded in the tree trunk or plant root, where it monitors electrical currents. When such activity is low, the sensor issues an alert. The Israeli researchers who developed the sensor device said that it will be extremely useful for farmers growing fruits and vegetables, and bring down irrigation expenses by up to 50%. Several Israeli companies manufacture and export woven high-tech plastic sheeting to Kenya. They also work on customised greenhouse projects, including consultation, installation and maintenance.

One of the leading companies of the district has also developed a global network of collaborations to deploy the geothermal energy of the Lake Naivasha area, in order to reduce the costs of heating the greenhouses. The farm receives technical advice and problem-solving knowledge from technicians sent there by US and German suppliers.

Training programmes are coordinated by international organisations, such as FAO (Food and Agriculture Organization of the United Nations); these mainly take place in The Netherlands. Some medium-sized and large companies are engaged in lifelong learning projects, which are organised due to labour mobility in parent or sister companies abroad.

8. CONCLUSIONS

This article proposed an interpretation of the industrial district as an open learning system. It has sought to deepen our theoretical understanding of the learning processes related to innovation occurring in industrial districts through emergent and deliberate knowledge structures. Emergent structures are characterised by spontaneous and non-deliberate forms of social interaction like social networks and CoPs. In contrast, deliberate structures such as business networks and formal R&D linkages with R&D organisations configure themselves as effective mechanisms through which firms form alliances to gain access to specialised complementary capabilities and/or new scientific knowledge. In this article, we maintained that both localised and distance learning play an important role. They are, in fact, non-substitutive but complementary.

In relation to the issue of detecting the main knowledge source of an industrial district, the conclusion which can be drawn from our empirical survey is the following. On the one hand, it would be wrong to focus only on those depending on 'internal-to-district' agents, as in the old Marshallian perspective. However, on the other hand, it would be equally wrong to stick to the

binary explanation of local buzz and global pipelines. In our empirical survey, all four mechanisms theorised in our paper emerged as relevant. In the Lake Naivasha cut-flower district, it is the 'blending' of local and distant forms of learning that has led to the introduction of multiple innovations (both radical and incremental), allowing for the application of international scientific novelties and their diffusion among the local firms.

In our case study, we detected the importance of both the emergent and deliberate forms of local and distant learning. From this perspective, we think that the Marshallian view of localised learning (and 'local externalities') ought not to be discarded (as implicitly suggested by some contributors, such as AMIN and COHENDET, 2004); rather, it should be contextualised in a more complex framework which includes the globalisation issue. We have shown that, among all the potential connections, emergent local ties complemented by extra-district emergent ties are important. They can activate a complex learning process that spurs innovation. In terms of public policies, this should stimulate more attention to the 'informal district networking' mechanism. Social networks and CoPs can be spontaneous, but they can also be 'cultivated' to adopt certain social practices or set the right policy incentives (WENGER et al., 2002).

Policies that substantially influence the mechanisms of collective learning could be selected. The levels of intervention could be oriented to the sponsoring of local managers to attend international trade fairs or the establishment of a district web site focused on local virtual communities (communities of exporters, technicians, agronomists or growers). These initiatives could initiate the formation of new emergent knowledge structures. Such solutions stress the normative side of local policies. The aim is the development of the necessary linkages between deliberate and emergent knowledge structures, in a context of co-evolution.

Our results are limited to a specific district, but analogous research findings are presented by BELUSSI and SAMMARRA (2010) in a volume that illustrates the technological evolution of many industrial districts and clusters in developed and developing countries, including Brazil, China and India. The fact that all data collected in our study come from a qualitative research design might be

seen as a limitation, due to the difficulties to draw generalizations from the results of the analysis; nevertheless, this allowed us to gain a complete view of the district's dynamics. Further research is necessary to provide more empirical evidence and allow generalisation of the research results.

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Fig. 1: A proposed analytical framework

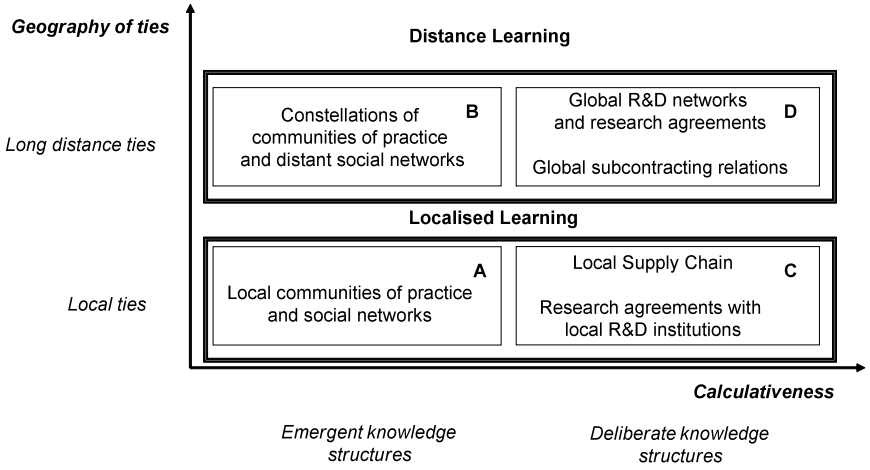
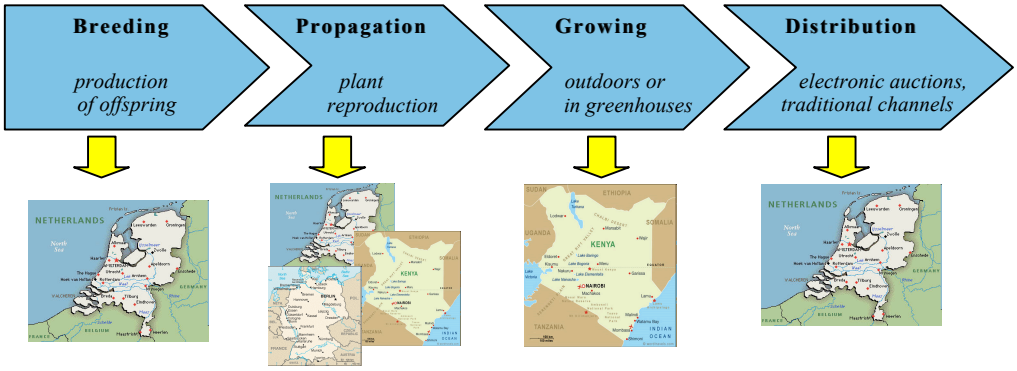


Fig. 2 The cut-flower industry value chain



Tab. 1 Types of knowledge structure in localised and distance learning

Company	Size*	Activity**	Localised learning		Distance learning	
			Emergent knowledge structure	**Deliberate knowledge structure**	**Emergent knowledge structure**	**Deliberate knowledge structure**
1	M	GP		Suppliers of weed killers, fertilisers and substratum; Biocontrol labs		Dutch R&D labs
					Conferences and trade fairs	
2	L	GPE		Suppliers of weed killers, fertilisers, plastic materials and substratum; KFC, Biocontrol lab (sister company)		British R&D labs and greenhouse technicians from Israel
					Conferences, business travels, trade fairs	
3	One of the two most important biocontrol firms in Kenya	L	Informal network with a local public research institute		Epistemic community of scientists	
			Trade fairs		Conferences, business travels, trade fairs	
4	S	G	Informal network with other small-scale producers	Training programmes, KFC, FPEAK, EPC, HCDA, Africa Now		
5	M	G	Informal network with leading firms (Oserian); Community of practice (LNGG)	Internal agronomists		Internal agronomists sent to Holland for training; Dutch R&D labs; Greenhouse technicians from Israel
			Trade fairs		Trade fairs in Holland	
6	M	GE	Community of practice (LNGG); Nairobi museum	Suppliers of weed killers and fertilisers; ICIPE, KPHI, Biocontrol labs		Dutch R&D labs
					Trade fairs in Holland	
7	L	BPGE	Community of practice (LNGG)	Formal network with other local R&D and Biocontrol labs		Geothermal technicians from US and Germany; Greenhouse technicians from Israel; British and Dutch R&D labs; University of Florida; Other

						subsidiaries in Holland and the UK.
					Conferences, business travel, trade fairs in Austria	
8	M	PG	Labour mobility from competitors; Community of practice (LNGG)	Formal network with Biocontrol labs		Suppliers of weed killers and fertilisers in Austria; Bonn University R&D labs; Greenhouse technicians from Israel
					Business travel	
9	M	P				Dutch R&D labs
					Business travel; Trade fairs	
10	L	GE		Formal network with local R&D labs		Dutch partners for process technology; Other subsidiaries in Holland
					Conferences, business travel, trade fairs	
11	Largest propagator in Kenya	P	Informal network with Kenyan experts	Suppliers of weed killers and fertilisers		Dutch companies and institutions
					Trade fairs in Holland; Networking with Dutch experts	
12	M	GE	Informal network with other local firms	Suppliers of weed killers, fertilisers and plastic materials; Biocontrol labs; KFC, FPEAK		Dutch R&D labs
					Business travel	
13	M	E		Formal network with local R&D labs, KFC and FPEAK		Dutch R&D labs and FAO training courses
					Business travel, trade fairs, conferences	
14	M	G	Community of practice (LNGG)	Local consultants and exporters, HCDA and KFC		
			Trade fairs, conferences		Trade fairs	

** Large integrated farms are coded as L; Small and medium-sized growers are coded as M; Small holders are coded as S. ** Types of activity are coded as follows: B = breeder; P = propagator G = grower; E = exporter; L = biocontrol lab. A combination of letters corresponds to companies involved in multiple activities.*

ENDNOTES

[1] See, for instance, the collective works published in the HSM in 1999, and the contributions of: BECATTINI and RULLANI (1996), BELUSSI, GOTTARDI and RULLANI (2003), COE and BUNNNEL (2003), OINAS (2002), BOSCHMA and TER WAL (2007), HUMPHREY and SCHMITZ (2002), BATHELT et al. 2004, GIULIANI et al. (2005), BOSCHMA (2005), MOODYSSON, COENEN and ASHEIM (2008), BATHELT and GLÜCKLER (2003), BELL (2005), and BELUSSI and SAMMARRA (2010).

[2] See, for instance, the metaphors of 'local buzz' and 'global pipelines' presented by Bathelt *et al.*, or the 'what if anything is localised' perspective assumed in the paper on Swedish fashion by HAUGE et al. (2009). Although the use of this metaphor has not created a large consensus (see, for instance, COOKE, 2005), it is clear that the introduction of these two concepts responds to the need of circumscribing the impact of the old 'local learning' perspective. But are external pipelines only generated by 'deliberate' firms' networks? In the perspective developed here, for instance, the participation of managers in international exhibitions allows local actors to be exposed to a distant 'buzz'. In other words, 'buzz' and 'pipelines' pertain both to the localised and to the distant 'dimensions' of learning structures.

[3] In this article, we use the term 'industrial district' to define the more precise Marshallian type, or the so-called Italianate, model. The industrial district model belongs to a class of different local systems (clusters, milieus, etc.). Often in the literature, the cluster model is superficially assimilated to the ID model, which, on the contrary, is a much more specific territorial and social entity, bearing identity, cultural characteristics, trust and cooperation. For a discussion, see BELUSSI (2006).

[4] The concept goes beyond the idea of a cluster of localised firms that considers learning and innovation occurring at a territorial level to be the result of an asymmetric but synergic interaction among private firms and public institutions, as it is assumed in the Porterian tradition, or in the 'national innovation system' approach.

[5] A similar result was found by BELL (2005) in his empirical evaluation of the innovativeness of the mutual fund cluster in Canada.

[6] See SCOTT (1988); HARRISON (1992); AMIN and ROBINS (1990); CAMAGNI (1991); SAXENIAN, (1994); LAZERSON (1995); GORDON (1996); ASHEIM (1996); ENRIGHT (1998); STABER (1998, 2001); PILOTTI (2000); CASTILLA et al. (2000); ACS (2000); JARRILLO (1988).

[7] PIORE and SABLE (1984) argued that localised networks of firms often prove to be a better organisational form than the large firm model when it comes to dealing with flexible demand and transferring knowledge, superseding the Fordist model of organisation (HARRISON, 1992).

[8] Hydroponics (from the Greek words *hydro,* water, and *ponos,* labour) is a method of growing plants using mineral nutrient solutions, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel or mineral wool. This procedure limits the pollution of the soil and of the natural water of Lake Naivasha.

[9] The information provided here is derived from DOLAN et al. (2002), along with our interviews.

[10] The Dutch auction system is a reverse auction, an on-line procurement method used to obtain quotations for commodities and services. In a reverse auction, something is purchased from the lowest quote (which is the 'reverse' of a normal auction, typically organised for unique artistic pieces sold for the highest quote to discerning bidders). A reverse auction is typically organised via the Internet, where in the same market there are hundreds of suppliers and wholesalers. Participants bid anonymously against each other for a specific quantity of a given item. Bidding takes place at a specified date and time, and continues for a specified time or until no more bids are received. Producers list their products first and then wholesalers express their interest.

[11] The cooperatives are oriented towards reducing dependency on the grader—who selects the flowers to be sold/exported—and increasing the price of flowers for buyers (currently, the rule is the average price of the last week).

[12] White Kenyans are British or Indian people that were born and/or established their businesses in Kenya.

[13] To maintain anonymity, the names of some of these organizations and respondents will not be disclosed.

[14] Integrated pest management (IPM) is a sustainable way to manage pests by combining biological, cultural and physical tactics. Frequently, two or more tactics, for example, cultural control and biological control, are combined instead of relying on only one management method. The goal is to manage rather than eliminate pests, without using chemical pesticides.

[15] Updated information is gathered from the KFC website (http://www.kenyaflowercouncil.org).

[16] Africa Now is an association which offers technical and financial support to farmers and small businesses. Training courses and visits abroad are organized to provide workers with better job opportunities.