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Clusters and Factors that Form the Dimensions of Local Development

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Abstract

From the 1980s onwards, a more significant development occurred in places where industrial agglomerates were installed. Focusing on factors that form the dimensions of local development may reveal actions that help to define improvement strategies for the regions. This study shows how factors — by the relations/interactions between the actors participating in clusters — interfere in the local development, considering the environmental, cultural, economic, spatial, institutional, political, and social dimensions. We chose a qualitative study, multi cases and content analysis. We identified aspects of the scope of each dimension and revealed a universe of factors that interfere in the local development in the clusters. The main "catalysts" and potential disseminators of actions promoting development were the Cooperation and Collectivity factor and the institutional dimension.

Keywords: clusters; local development; multidisciplinary analysis.

Introduction

Between 1900 and 1950 (the Classical Industrial Era), companies were utterly vertical, used the mass production system, and had "disproportionate" structures. In turn, between 1960 and 1990 (the Neoclassical or Post-Fordist Industrial Era), there was a new technical and economic paradigm based on organizational frameworks supported by cooperation and interactive learning (Lastres & Cassioalto, 2003), vertical disintegration or deverticalization processes, and "leaner"

production systems (Fochezatto, 2010; Olivares & Dalcol, 2010). Starting in 1970, significant changes in the industrial organization of companies — forming industrial clusters, with the strengthening of relations and higher engagement of the agents — took place (Marini & Silva, 2012; Olivares & Dalcol, 2010, 2014; Ribeiro, Martinelli, & Joyal, 2013).

Between 1980 and 1990, according to Santos, Diniz, and Barbosa (2004), it became necessary to understand the concentration of companies around a specific place and productive activity. According to Costa (2010), the Brazilian concept of Local Productive Arrangement (Arranjos Produtivos Locais – APL) was created by the Ministry of Science and Technology (MCT) around 1990, based on two pioneering development experiences: the Italian industrial districts and the Silicon Valley, in California.

APL constitute one of the possibilities for regional development (Marini & Silva, 2012). Several studies have proposed an association between local development and the presence of clusters (Isbasoiu, 2007; Lastres & Ferraz, 1999; Oliveira & Martinelli, 2014b; Sforzi & Boix, 2015). Looking at the factors and dimensions of local development may reveal structures not yet observed and help elaborate strategies for improving and developing the cluster and its region.

Marini and Silva (2012) elaborated a matrix with seven interrelated dimensions (environmental, cultural, economic, spatial, institutional, political, and social) in the APL that have not been jointly contemplated in studies in this area.

Concerning social development and clusters, these dimensions refer to interdisciplinary aspects of the production (and reproduction) territory of social and practical relationships. They are formed by factors representing the experiences and actions of individuals participating in a cluster's region.

In this context, we aimed to study the relationships and interactions between the actors participating in the clusters/APL — how the factors interfere with local development, considering the environmental, cultural, economic, spatial, institutional, political, and social dimensions. The specific goals were: (a) to identify the dimensions and the factors present in clusters/APL, considering their potential interference with local development; and (b) to allocate the factors according to the dimensions of local development.

Identifying factors and dimensions was an initial effort in line with the understanding of local development and essential to reveal the direct (i.e., immediate) interferences and show both the dimensions generating the factors and the first actions that may influence said dimensions.

The article is structured as follows: this introduction; the literature review; the methodological aspects; discussion, analyses and results; lastly, final remarks and references.

Theoretical framework

Systemic review: industrial clusters and local development

Initially, we carried out a search in the Scopus database (Editora Campus/Elsevier) and in the Web of Science (Thomson Reuters Scientific) to locate studies between 2010 and 2015 and learn

about the current scenario of publications in this area, discussing one or more of the seven dimensions of local development in clusters. Web of Science is the oldest Social Sciences database (Benítez Hurtado, Carpes, Inomata, & Rados, 2012) and can be considered the most important bibliometric analysis source (Van Leeuwen, 2006). It includes four collections in this area: Science Citation Index Expanded (SCI-EXPANDED); Social Sciences Citation Index (SSCI); Arts & Humanities Citation Index (A&HCI); and Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH) (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, n. d.). The Scopus database indexes peer-reviewed academic titles and is the most extensive database for bibliographic references of scientific literature in the world (Elsevier, c2021).

We searched for complete studies without language restrictions¹. After reading the abstracts (if sufficient) and the complete texts (if further clarification was required), we found nine studies: spatial dimension (four “clusters” and “spatial dimension”; one “industrial districts” and “spatial dimension”); social dimension (two “clusters” and “social dimension” and one “*arranjo produtivo local*” and “*dimensão social*”); environmental dimension (one “*arranjo produtivo local*” and “*dimensão ambiental*”); cultural, political, economic, and institutional dimensions (no studies).

In total, we selected five studies (two in the Scopus database and seven in the Web of Science database, with repetition of studies in the different databases) that contemplated dimensions of local development: Alvarenga, Matos, Machado, Sobreira, and Matos (2013), Belso-Martinez (2010), Carrol and Zeller (2012), Doloreux, Shearmur, and Guillaume (2015), and Herrerias and Ordoñez (2012). Nevertheless, these studies did not consider integrating the dimensional framework (complex, multi, and interdisciplinary) of territory construction, the relationships between the agents, and their interrelationships with space and dimensions.

Local productive arrangements: creation, construction of the concept, and formative factors

The spatial concentration of economic activities happens due to two opposing forces: **agglomeration** (originating from the triad of Marshallian foreign economies – specialized/skilled labor; the presence of knowledge spillovers; and the provision of services and specialized raw materials) (Costa, 2010; Fochezatto, 2010; Marshall, 1996); and **dispersion** (immobility of labor, high transportation costs, and external effects of the environment) (Bekele & Jackson, 2006; Krugman & Venables, 1996). In the view of Becattini’s Industrial Districts, the organizations are agents of production; knowledge is the driver of production; and the “*homines novi*” are the agents of entrepreneurship. Together, they form a mixture of feelings of belonging, which unites individuals in their common interest and the historical, social, and cultural nature (Fochezatto, 2010; Sforzi & Boix, 2015).

Clusters/APL are groups of associated companies from similar/related sectors generating externalities resulting from historical, economic, and social factors (Casanueva, Castro, & Gálan, 2013), with mechanisms for transferring knowledge (Casanueva et al., 2013; Delgado, Porter, & Stern, 2014). Despite different literature concepts, they share the major characteristics (Marini & Silva, 2012).

In this study, we chose the term APL created by Cassiolato, Lastres, and Stallivieri (2008) to refer to economic, political, and social agents who share the same territory and have (initial) ties with the agents connected to the main activity: public/private organizations; organizations that

produce/provide goods and/or services; organizations working with human resource qualification; institutions associated with research, development, and engineering; and those focusing on politics, financing and incentive actions. According to Porter (2000), the term cluster has been used internationally.

For externalities and development to exist, there must be interrelations (Carrol & Zeller, 2012; Marini & Silva, 2012), trust and the creation of territorial ties (Lastres & Cassiolato, 2003). The synergy takes place as long as cooperation and collective consciousness are the basis of the generation of results (Alvarenga et al., 2013).

Space is transformed by human innervation, and at the same time, it transforms the individuals sharing that space (Corrêa, 2000). The territory is a socially constructed space, resulting from social representations (manifestations and habits) (Albuquerque, 1998; Boisier, 2001; Brandão, 2007; Joyal & Bessa, 2012; Lemos, Santos, & Crocco, 2005; Marini & Silva, 2012), and it is also permeated by conflict (Brandão, 2007).

According to Di Giacinto, Gomellini, Micucci, and Pagnini (2013), the local community fosters productive clusters by coexisting and sharing cultural and ethical values. Marini and Silva (2012) affirm that cooperation relies on social and institutional relationships, with local social capital being a key component. According to Lastres and Cassiolato (2003), based on the ideas of Bourdieu (1986, 1998), Coleman (1988) and Putnam (2006), recognized due to the importance of social relationships for understanding and intervening in economic activities.

The bonds of friendship and cooperative trust facilitate the flows of information. Moreover, governance plays an essential stimulating role and is a fundamental manager of democratic practices (Casanueva et al., 2013; Cassiolato & Szapiro, 2003). The wide range of support institutions, both public and private, can better explore and transfer information, knowledge, and opportunities, continuously refined by internal reactions, proximity, and the intensity of the exchanges (Molina-Morales & Martinez-Cháter, 2016). According to Carrol and Zeller (2012), Herrerias and Ordoñez (2012), Lastres and Cassiolato (2003), and Marini, Silva, Nascimento, and Strauhs (2012), it is necessary to include the State in order to support local governance.

Studies on APL present aspects, characteristics, or variables that compose their structure and are important for stimulating and reinforcing practices, building factors associated with local development (Table 1).

Table 1

Factors present in corporate clusters mentioned in the literature

Factor	Authors
Promoting agent	Joyal and Bessa (2012); Martinelli and Joyal (2004); Mattos (2008).
Government support	Carrol and Zeller (2012); Herrerias and Ordoñez (2012); Lastres and Cassiolato (2003); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004); Mattos (2008); Ribeiro et al. (2013).
Articulation	Alvarenga et al. (2013); Belso-Martinez (2010); Carrol and Zeller (2012); Cassiolato and Szapiro (2003); Dias (2011); Lastres and Cassiolato (2003); Lübeck, Wittmann and Silva (2012); De Marchi, Lee and Gereffi (2014); Marini and Silva (2012); Mattos (2008); Olivares and Dalcol (2010); Santos, Diniz and Barbosa (2004); Vecchia (2006).

Social capital, social cohesion	Alvarenga et al. (2013); Carrol and Zeller (2012); Cunha, Passador and Passador (2012); Di Giacinto et al. (2013); Marini and Silva (2012); Martinelli and Joyal (2004); Mattos (2008); Oliveira (2013).
Competition	Martinelli and Joyal (2004); Porter (2000).
Competitiveness	Dias (2011); Lastres and Cassiolato (2003); Porter (2000); Santos et al. (2004).
SMEs composition	Alvarenga et al. (2013); Marini and Silva (2012); Martinelli and Joyal (2004); Mitchell, Boyle, Burgess and McNeil (2014); Vecchia (2006).
Trust	Belso-Martinez (2010); Casanueva et al. (2013); Cunha et al. (2012); Lastres and Cassiolato (2003); De Marchi et al. (2014); Martinelli and Joyal (2004); Marini and Silva (2012).
Cooperation, collectivity	Alvarenga et al. (2013); Belso-Martinez (2010); Carrol and Zeller (2012); Casanueva et al. (2013); Cassiolato and Szapiro (2003); Cunha et al. (2012); Dias (2011); Doloreux et al. (2015); Joyal and Bessa (2012); Lastres and Cassiolato (2003); Lübeck et al. (2012); Marini and Silva (2012); Martinelli and Joyal (2004); Mattos (2008); Olivares and Dalcol (2010); Oliveira (2013); Oliveira and Martinelli (2014a); Santos et al. (2004); Vecchia (2006).
Regional culture	Alvarenga et al. (2013); Albuquerque (1998); Belso-Martinez (2010); Boisier (2001); Cunha et al. (2012); Di Giacinto et al. (2013); Ganzert (2010); Lastres and Cassiolato (2003); Lemos et al. (2005); Marchi et al. (2014); Marini and Silva (2012); Martinelli and Joyal (2004); Mattos (2008); Sforzi and Boix (2015).
Geographic and spatial delimitation	Alvarenga et al. (2013); Carrol and Zeller (2012); Doloreux et al. (2015); Lastres and Cassiolato (2003); Marini and Silva (2012); Olivares and Dalcol (2010); Vecchia (2006).
Democracy	Dias (2011); Martinelli and Joyal (2004); Mattos (2008); Santos et al. (2004).
Diversity of organizations	Lastres and Cassiolato (2003); Marini and Silva (2012); Mattos (2008); Molina-Morales and Martinez-Cháter (2016).
Hierarchical Balance between Actors/Agents	Dias (2011); Lastres and Cassiolato (2003); Lübeck et al. (2012); Martinelli and Joyal (2004); Santos et al. (2004).
Strengthening of financial ties	Belso-Martinez (2010); Casanueva et al. (2013); Corrêa (2000); Lastres and Cassiolato (2003); Lemos et al. (2005); Marini and Silva (2012); Marchi et al. (2014); Molina-Morales and Martinez-Cháter (2016).
Strengthening of social ties	Belso-Martinez (2010); Casanueva et al. (2013); Corrêa (2000); Cunha et al. (2012); Lastres and Cassiolato (2003); Lemos et al. (2005); Marchi et al. (2014); Marini and Silva (2012); Molina-Morales and Martinez-Cháter (2016).
Mutual gains	Alvarenga et al. (2013); Bekele and Jackson (2006); Carrol and Zeller (2012); Fochezatto (2010); Lastres and Cassiolato (2003); Mattos (2008); Olivares and Dalcol (2010); Molina-Morales and Martinez-Cháter (2016); Sforzi and Boix (2015).
Generation of externalities, synergy	Alvarenga et al. (2013); Carrol and Zeller (2012); Casanueva et al. (2013); Lastres and Cassiolato (2003); Lübeck et al. (2012); Marini and Silva (2012); Porter (2000).
Governance, coordination	Cassiolato and Szapiro (2003); Joyal and Bessa (2012); Cunha et al. (2012); Lastres and Cassiolato (2003); Lübeck et al. (2012); Marchi et al. (2014); Marini and Silva (2012); Mattos (2008); Oliveira (2013).
Inclusion of the local community	Alvarenga et al. (2013); Joyal and Bessa (2012); Lastres and Cassiolato (2003); Martinelli and Joyal (2004); Ribeiro et al. (2013).
Innovation	Alvarenga et al. (2013); Bekele and Jackson (2006); Casanueva et al. (2013); Dias (2011); Doloreux et al. (2015); Lastres and Cassiolato (2003); Lübeck et al. (2012); Martinelli and Joyal (2004); Mattos (2008); Oliveira (2013); Olivares and Dalcol (2010); Santos et al. (2004); Vecchia (2006).
Improvements in the areas of administration	Lastres and Cassiolato (2003); Mitchell et al. (2014); Porter (2000).

International market	Dias (2011); Lastres and Cassiolato (2003); Mattos (2008); Santos et al. (2004).
Mutual participation	Alvarenga et al. (2013); Carrol and Zeller (2012); Marchi et al. (2014); Marini and Silva (2012); Martinelli and Joyal (2004).
Negotiation of interests	Brandão (2007); Joyal and Bessa (2012); Lastres and Cassiolato (2003); Martinelli and Joyal (2004); Oliveira (2013); Oliveira and Martinelli (2014a).
Common objectives	Alvarenga et al. (2013); Carrol and Zeller (2012); Lastres and Cassiolato (2003); Marini and Silva (2012); Sforzi and Boix (2015).
Historical processes (formation and development)	Bekele and Jackson (2006); Casanueva et al. (2013); Cunha et al. (2012); Lastres and Cassiolato (2003); Lemos et al. (2005); Mattos (2008); Sforzi and Boix (2015).
Geographic and spatial proximity	Alvarenga et al. (2013); Bekele and Jackson (2006); Carrol and Zeller (2012); Doloreux et al. (2015); Lastres and Cassiolato (2003); Marchi et al. (2014); Marini and Silva (2012); Mitchell et al. (2014); Molina-Morales and Martinez-Cháter (2016); Olivares and Dalcol (2010); Vecchia (2006).
Similar and/or related sectors	Alvarenga et al. (2013); Belso-Martinez (2010); Casanueva et al. (2013); Joyal and Bessa (2012); Lübeck et al. (2012); Marini and Silva (2012); Mattos (2008).
System of formal standards	Carrol and Zeller (2012); Casanueva et al. (2013); Cunha et al. (2012); Lastres and Cassiolato (2003); Lemos et al. (2005); Marini and Silva (2012).
System of informal standards	Carrol and Zeller (2012); Casanueva et al. (2013); Cunha et al. (2012); Lastres and Cassiolato (2003); Lemos et al. (2005); Marini and Silva (2012).
Transference of information/knowledge, learning	Alvarenga et al. (2013); Bekele and Jackson (2006); Belso-Martinez (2010); Carrol and Zeller (2012); Casanueva et al. (2013); Costa (2010); Delgado et al. (2014); Doloreux et al. (2015); Fochezatto (2010); Joyal and Bessa (2012); Lastres and Cassiolato (2003); Lübeck et al. (2012); Martinelli and Joyal (2004); Molina-Morales and Martinez-Cháter (2016); Porter (2000).

Source: Elaborated by the authors.

Public or private strategies in productive clusters may provide an alternative for more significant development, contemplating dimensions beyond the financial one, considering pre-existing factors in the territories of the arrangements, which also permeate the environmental, institutional, political, spatial, social, and cultural dimensions.

Local development: development from territory formation

In the last decades of the 20th century, transformations such as globalization, technological advancement, and the restructuring of the productive system redirected the discussions about the development process (Albuquerque, 1998; Alvarenga et al., 2013; Benko, 2002; Brandão, 2007; Fochezatto, 2010; Marini & Silva, 2012; Martinelli & Joyal, 2004). According to Cardoso (2014), Marini and Silva (2012), and Veiga and Zatz (2008), from the end of World War II to the mid-1970s, development was not distinguishable from economic growth, as demonstrated by the way the economic system generated technical progress and productivity – the Gross Domestic Product (GDP). However, it was necessary to “recover the big gap . . . between GDP and poverty. Especially because the GDP does not include asset depreciation, as is the case with the degradation of ecosystems” (Veiga, 2007, p. 41); thus incorporating aspects and factors which were still absent (Cardoso, 2014).

Since then, many discussions have contemplated the idea of development with the necessary inclusion of several aspects: **(formal and informal) institutions**, which are the center of sociability (Abramovay, 2001); **a holistic view** in order to jointly look at several dimensions; **sustainability and durability** (eco-development/sustainable development, by Ignacy Sarchs); **synchronous commitment** (more urgent social needs), **diachronic commitment** (possibility to replicate systems for the next generation) (Montibeller, 1993); and the **strengthening of democratic practices**, with collective participation, freedom of choice and protection of rights (Veiga & Zatz, 2008).

Regional governance is necessary for development because trust and more collective, comprehensive and transparent actions are more present in local spheres (Veiga, 2014). The territory results from integrated construction and a productive, multidimensional cohesion, with actions generated, maintained, and transformed by an institutional framework (Brandão, 2007).

Clusters are industrial forms that generate concrete transformations in their locations; therefore, the socioeconomic process must be understood as a form of local development, under a territorial perspective (Marini & Silva, 2012; Mattos, 2008; Sforzi & Boix, 2015).

The studies and theories regarding regional development evolved from the microeconomic approaches to industry localization, which considered the geographic space a simple place, focused on maximizing choice for the best location. In the 1970s, territory started being understood as resulting from social production (Brandão, 2007). The territory is a condition for development because it has specific (material and immaterial) resources belonging to the region, which are non-transferable and build local history (Iizuka, Gonçalves-Dias, & Aguerre, 2012).

In the decade of 1980, Endogenous Growth Theories emerged, which say the technological progress is endogenous (Marini & Silva, 2012). The focus is regional/local, considering a multidimensional interconnection between the elements. The new paradigm establishes that local actors/agents must structure the development themselves (Martinelli & Joyal, 2004). The Theory of Regional Development proposes the cluster/APL approach for development actions and practices in clusters (Vecchia, 2006).

Analyzing the local concepts of development, Marini e Silva (2012) mentioned that there is different terminology for the same convergence point: the need to value a variety of territorial issues, not only economic ones.

In this study, we use the term Local Development, presented by Fragoso (2005), as actions aimed at long term change, seeking to promote the quality of life of individuals in a territory by interest, articulation, and involvement of all players from different levels of society (internal and external agents), constituting a collective and educational process of transformation, focusing on change as the main characteristic for development, (re)building the future.

In the studies on local development, the understanding of sustainability gave rise to the incorporation of the social, economic, environmental, spatial, and cultural dimensions (Boisier, 2001; Ribeiro et al., 2013). Moreover, we should also consider the political and institutional dimensions to evaluate the interactions present in the territorial space (Marini et al., 2012) because they form the political-administrative structure, one of the main elements of the idea of territory (Boisier, 2001; Marini et al., 2012).

Locations are territories with formative factors and transforming factors of the dimensions, and consequently, the possibility of intervention to improve the quality of life. As mentioned earlier, the literature makes important contributions to understanding the impacts on local development, presenting elements that constitute factors that permeate the territories. According to Mattos (2008), transforming the environment to achieve development involves a (multi and inter) complex of variables: diversity and associations that must be translated into practices that consider the different dimensions. Table 2 summarizes, according to the literature review, the authors who mentioned the dimensions of local development and the main aspects encompassed by each of them.

Table 2

General aspects of the dimensions of local development

Dimension of local development	Aspects
Authors	
Environmental Alvarenga et al. (2013); Boisier (2001); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004).	Protection of the environment, allowing nature to find new balance with minimum deterioration, using innovative processes to allocate renewable resources, preserving the sources of energy and natural resources.
Cultural Alvarenga et al. (2013); Boisier (2001); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004); Mattos (2008); Oliveira (2013).	Formation and transformation of cultural aspects by elaborating local development strategies based on collectivity, enabling it to manifest in the habits, standards, stories, and an integrated and shared vision. Considers the plurality of particular solutions regarding the specificities of cultures and places, and society's historical formation.
Economic Alvarenga et al. (2013); Boisier (2001); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004); Mattos (2008); Oliveira (2013).	Economic prosperity through more efficient resource allocation and management and improvements in productivity and competitiveness that are compatible with the principles of local development. Considers both public and private participation and responsibility.
Spatial Boisier (2001); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004).	Flexible geographical and spatial delimitation of the cluster composition according to issues that need addressing, avoiding the spatial concentration of groups, production activities, and knowledge, considering both rural and urban areas.
Institutional Boisier (2001); Cunha et al. (2012); Iizuka et al. (2012); Lastres and Cassiolato (2003); Lemos et al. (2005); Lübeck et al. (2012); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004).	Political and administrative structure responsible for the organization of the territory, coordinating the aspects necessary to the other dimensions, seeking continuous transformation of the social representations and trust in cooperative actions. Considers the generation of an environment conducive to the equitable distribution of opportunities, innovation, and quality of life improvements. Works directly with collective learning by formal and informal structures.
Political Boisier (2001); Marini and Silva (2012);	Influence and/or integrated participation of the authors/agents, capable of generating and maintaining

Marini et al. (2012); Martinelli and Joyal (2004); Mattos (2008); Oliveira (2013).	local initiatives in constant construction and adaptation, enabling the creation of a local environment that encourages production and, and the same time, articulates ideas and actions for the development of the region.
Social Alvarenga et al. (2013); Boisier (2001); Cunha et al. (2012); Marini and Silva (2012); Marini et al. (2012); Martinelli and Joyal (2004); Mattos (2008); Oliveira (2013).	Substantial reduction of social differences, both material and immaterial, permeated by criteria for social equity. Participative integration of the economic and social actors with the local institutions, legitimizing social conducts, producing a system of lasting relations that constantly incorporates society's values into the development process.

Source: Elaborated by the authors.

Besides, it is necessary to incorporate into the analyses essential conditions for the complexity of interrelationships between the factors and dimensions: synchronous and diachronic commitment (Montibeller, 1993); perspective of territory (Albuquerque, 1998; Boisier, 2001; Brandão, 2007; Iizuka et al., 2012; Marini & Silva, 2012; Martinelli & Joyal, 2004; Ribeiro et al., 2013; Sforzi & Boix, 2015); the association between the seven dimensions (Marini & Silva, 2012), and temporal perspective (long term) as an intrinsic and gradual component (Abramovay, 2001; Cunha et al., 2012; Martinelli & Joyal, 2004).

Methodological aspects

We used a qualitative approach of applied and descriptive nature, according to the multicase study proposed by Triviños (1987).

Qualitative research categorizes content elements according to the affinity of meaning (Silva, Gobbi, & Simão, 2005). Considering Table 2, the following categories of analysis were defined: (a) environmental aspects; (b) cultural aspects; (c) economic aspects; (d) spatial aspects; (e) institutional aspects; (f) political aspects; (g) social aspects.

Regarding the scope of the research, we carried out the analysis of three APL/clusters located in the Southeast and Midwest regions of Brazil, with different focus areas, aiming to produce a broader data set. These choices also considered suggestions of state program managers for APL and researchers of the topic, formal certification of the cluster, cluster consolidation, availability for participation, potential to show the seven (integrated) dimensions, and capacity for multidimensional analysis of the local development. Moreover, the choices were made for convenience, considering the geographic proximity of the arrangements, the time established for concluding the research, and the budget available for traveling to the central city of each cluster.

We used three techniques to collect data: **bibliographic** and **documentary research** – digital files for information sharing and production reports, journal publications, fliers for qualification and marketing courses, panels, emails, and websites (Central Association of Fruit Growers of the North of Minas/Associação Central dos Fruticultores do Norte de Minas – ABANORTE; Industrial Software Pole/Polo Industrial de Software – PISO; Union of Confectionists of Taquaral/ União dos Confeccionistas de Taquaral – UNICA); **semistructured interviews** and **elements of non-**

participating observation (movements, actions, and clarifications provided by the participating actors from the arrangements, inside and outside of the interviews). The interview script was elaborated based on the literature review, focusing on the factors mentioned (Table 1) and the association of these factors with the seven dimensions of local development (Table 2).

Table 3

Objects of study and research corpus

Cluster (year of certification) – Location	Governance (year of foundation)	Municipalities involved	Main activity	Interviewees
Clothing production in Taquaral de Goiás (2017) – State of Goiás	UNICA (2008) Association for APL Certification (2015)	Taquaral de Goiás, Goiandira, Cidade de Goiás, Santa Rosa, Itauçu, Inhumas, Buriti de Goiás, Itaberaí, and others	High quality, fine craft lingerie	<ul style="list-style-type: none"> - 1 executive and president of the Association for Formal Certification (seed) - 1 executive and vice president of the Association for Formal Certification - 1 executive and manager of the Association for Formal APL Certification - 1 executive and secretary of industry and commerce at the municipality - 1 executive and former president of ÚNICA - 3 executives - 1 executive and manager at the city hall - 1 mayor - 1 saleswoman - 1 tailor
Fruit growing in Jaíba (2012) – State of Minas Gerais	ABANORTE (1993)	Itacarambi, Jaíba, Janaúba, Matias Cardoso, Nova Porteirinha, Porteirinha, Verdelândia, Capitão Enéas, Montes Claros, São Francisco, Januária, Pedras de Maria da Cruz and Manga	Banana, mango, papaya and lemon	<ul style="list-style-type: none"> - 1 manager at ABANORTE (seed) - 2 producers and participants in the ABANORTE councils - 1 agronomist and producer - 1 employee in charge of management, fieldwork - 1 agricultural technician, fieldwork - 1 supervisor in the area of human resources and production, fieldwork
Software in Ribeirão	PISO (2004)	Altinópolis, Barrinha, Brodowski, Cajuru,	Management	- 1 economic development manager and technician at FIPASE ^a

Preto (2013) – State of São Paulo	Cássia dos Coqueiros, Cravinhos, Dumont, Guariba, Guatapar, Jaboticabal, Jardinpolis, Luis Antnio, Monte Alto, Pitangueiras, Pontal, Pradpolis, Santa Cruz da Esperana, Santa Rosa de Viterbo, Santo Antnio da Alegria, So Simo, Serrana, Sertozinho and Taquaral	software for different sectors of goods and services	- 1 executive director at PISO (seed)
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^a Advanced Pole Health Institute Foundation in Ribeiro Preto (Fundo Instituto Polo Avanado da Sade em Ribeiro Preto – FIPASE).

Source: Elaborated by the authors.

The corpus of the research was defined from a Snowball sample (Vinuto, 2014), starting with key informants, the **seeds**, who suggested available individuals with different profiles/positions (Table 3). The interviews were carried out between 2017, April 18th and 2017, October 23rd, with 21 interviewees and a duration of approximately 20 hours.

The data was interpreted by content analysis (Bardin, 2010). The interviews were thoroughly analyzed, and we constructed a table with two columns: The first column shows the content of each excerpt from the utterances; the second column contains the identification of factors interfering with local development (as described in the first column). The second column was later transferred to Excel, presenting all the groups of factors in alphabetical order for organizational purposes. The study was based on an inductive focus regarding the data analysis. Initially, we used the 33 factors from the literature review. Then new factors arose, following the same premise of the analysis categories (relevant for the research goal, thorough but not excessive, precise, and mutually exclusive). In the end, we found 54 factors.

Data presentation, analysis, discussion, and results

Initially, we identified the dimensions and the factors present in the APL considering the possibility of interference with local development (Table 4). All the seven dimensions were expressed either directly or indirectly by the utterances, in association with the activities and interference with the development of the regions. Several factors interfering with local development could be identified either directly or indirectly, confirming what the literature states (highlighted in Table 4) or revealed by the data collected (no highlight in Table 4).

Table 4

Factors interfering with local development

<u>Promoting agent</u>	<u>Gains</u>
<u>Government support</u>	<u>Generation of externalities, synergy</u>
<u>Articulation</u>	<u>Governance, coordination</u>
Compliance with environmental laws	<u>Inclusion of the local community</u>
<u>Social capital, social cohesion</u>	Consumer inclusion
<u>Competition</u>	<u>Innovation</u>
Social competition (inside)	Freedom of action, individual action
Social competition (outside)	<u>Improvements in the areas of administration</u>
<u>Competitiveness</u>	<u>International market</u>
<u>SMEs composition</u>	<u>Mutual participation</u>
Political communication	<u>Negotiation of interests</u>
Adequate geographical and spatial Conditions	<u>Common objectives</u>
<u>Trust</u>	Political partisanship
Environmental awareness	<u>Historical processes (formation and development)</u>
Belief in joint success	Professionalism
<u>Cooperation, collectivity</u>	Social projects (development)
<u>Regional culture</u>	Social projects (donation)
<u>Geographic and spatial delimitation</u>	<u>Geographic and spatial proximity</u>
<u>Democracy</u>	Recognition of one's contributions
Development of respectful social Relationships	Directly related to the financial dimension
<u>Diversity of organizations</u>	<u>Similar and/or related sectors</u>
Commitment to environmental projects	<u>System of formal standards</u>
Commitment to social projects	<u>System of informal standards</u>
<u>Hierarchical balance between actors/agents</u>	<u>Transference of information/knowledge, learning (inside)</u>
<u>Strengthening of financial ties</u>	<u>Transference of information/knowledge, learning (outside)</u>
<u>Strengthening of social ties</u>	Shared vision
Group formation	Region visibility

Source: Elaborated by the authors.

Although all the factors presented in the literature review interfere with development, it is important to mention that this interference happens by either contributing or inhibiting, considering that a certain factor may be present or absent. Being present or absent is an inconstant condition/situation. It depends on the topic being discussed and the moment and/or group of individuals establishing a relationship with the factor at a given time. This condition was pointed out in the three clusters studied, corroborating Lastres and Cassiolato (2003) and Molina-Morales and Martínez-Cháter (2016). They demonstrated differences in the benefits of clustering, which may indicate that the involvement profile is different from one organization to another.

The Software APL did now show the following factors: **Compliance with Environmental Laws; Social Competition (Inside); Social Competition (Outside); Consumer Inclusion; Political Partisanship and International Market.** Regarding International Market, there are export decisions, but they are particular to the companies' strategies and not an APL factor.

In general, for the remaining factors not mentioned in the literature, all interviewees reported understanding the interference of the factors with local development. The factor **Consumer Inclusion** was continuously mentioned by only one of the Fruit Growing APL producers as a factor to help reach development. Another factor mentioned by the interviewees was **Political Partisanship** as a source of obstacles for cooperation, with significant recurrence in the Clothing Production APL.

Another important moment regarding the factors was related to the position held in Jaíba and Taquaral de Goiás. In the positions at the base level, the utterances referred to the lack of perception of development due to social transformation, mostly in the context of the interview mentioning the factors **Social Projects (Donation and Development)** and **Directly Related to the Financial Dimension.** This perception is different among interviewees who were owners or held management positions; only five interviewees strictly associated development with social transformation (two executives and managers of the Association for Formal Certification and one executive – Clothing Production APL; and one manager at ABANORTE and one producer – Fruit Growing APL). They talked about their experiences and perspectives, strictly associating local development with actions and practices that consider learning/knowledge, the collective, as an essential tool for transformation and better distribution of income, opportunities, and gains.

We also observed that the factor **Gains** was denominated “**Mutual Gains**” in the literature; however, we found that in the context analyzed in the three arrangements, these gains, although significant, were not mutual. The results show a loss regarding the income distribution, as the gains were not equitable among the participants. That was true especially for financial gains and access to quality services such as security, education, and health, which were more significant for some than for others.

Table 5 shows the meaning of each of the factors not presented in the literature review in the context of local development.

Table 5

Factors of local development not mentioned in the literature review

Factor	Meaning
Compliance with environmental laws	Concern and commitment to complying with environmental laws.
Social competition (inside) and (outside)	Competition regarding social status, being better and/or performing better and/or deserving more than others, with competitive conditions expressed by social behaviors. Inside social competition happens among individuals/groups inside the same

	arrangement; outside social competition happens among individuals/groups of other arrangements. We observed the same situation for the factor Transference of information/knowledge, learning.
Political communication	Ability to persuade groups to support actions based on the importance, need, and convenience of collaborating.
Adequate geographical and spatial conditions	Geographical and spatial aspects provide adequate conditions for the main activity, such as geography, infrastructure, and spatial distribution.
Environmental awareness	Awareness of the need for actions and practices focusing on preserving the environment.
Belief in joint success	Certainty that collective actions will lead to more benefits and success.
Development of respectful social relationships	Social relationships based on respect and conciliation, contributing to maintaining long-term collective actions, even if diverging interests are present.
Commitment to social projects	Projects are discussed and implemented with actions focusing on the society for better income distribution, access to the job market, and education.
Commitment to environmental projects	Projects are discussed and implemented with actions focusing on preserving the environment, preserving springs, reforestation, and proper disposal of production waste.
Group formation	Diverging ideas in decision-making and actions performed, forming a fragmented culture by differences in values and objectives and leading to conflict.
Consumer inclusion	Understanding that consumers/final clients are essential for development and important in determining what should be produced and how it should be produced.
Freedom of action, individual action	Consent for individual actions, whether they contribute or not. Each actor/agent decides to participate (or not) in the activities, which does not compromise relations.
Political partisanship	Partisan orientations permeate actions and decisions, leading to the disruption of long-term relationships, trust, respect, and collectivity.
Professionalism	There are improvements in professionalization in decision-making, discussions, relations, articulation, cooperation, respect, and administrative processes in general.
Social projects (development)	Social projects, considering income distribution elements, access to the job market, and access to education.
Social projects (donation)	Social projects with the sole purpose of donating, with no concern for development.
Recognition of one's contributions	Recognition that improvements are made possible by the ideas, efforts, and actions of other participants.
Directly related to the financial dimension	The actions were motivated and made possible only by purposes directly associated with the financial dimension.

Shared vision	The arrangement is understood as having a joint (collective) nature, with the belief that it is necessary to share and join efforts.
Region visibility	The region has become known by other (national and/or international) regions due to its potential for development.

Source: Elaborated by the authors.

The 54 factors form a complex universe expressed by reticulated manifestations and actions which permeate and interfere with the dimensions. In the second stage of this study, we aimed to allocate these factors into the analysis categories.

The literature indicated 33 factors and actions adjacent to the dimensions. This study did not aim to identify the factors initially affected nor to consider the dimensions for development; thus, the authors only signaled the dimensions. The factors were allocated into the dimensions best represented by them – meaning which dimension is an immediate generator of a given factor and showed immediate results after implementing factor-focused actions. We began the associations with suggestions for underlying actions and concepts of each factor, expanding our understanding from the review of the state-of-the-art literature. Regarding the 21 factors revealed strictly by the content analysis, factor-dimension allocation was carried out exclusively from the data and contexts narrated in the interviews. Table 6 shows the factor-dimension association with no differences found between arrangements.

Table 6

Factor-dimension analysis

Factor identified/Dimension allocated	Rationale
Environmental dimension	
<u>No factors were revealed in the literature review</u> Compliance with Environmental Laws; Environmental Awareness; Commitment to Environmental Projects	The factor is directly associated with natural resources and the preservation of the environment.
Cultural Dimension	
<u>Regional Culture; Historical Processes (Formation and Development); System of Formal Standards; System of Informal Standards</u> Group Formation; Shared Vision	The factor is immediately associated with the way things work, manifestations, values, and the construction of standards of conduct, habits, a feeling of belonging, and identification (or lack of identification) with the cluster territory.
Economic Dimension	
<u>Competition; Competitiveness; Strengthening of Financial Ties; Improvements in the Areas of Administration; Similar and/or Related Sectors</u> Consumer Inclusion; Directly Related to the Financial Dimension; Region Visibility	The factor directly stimulates improvements in goods and processes, leading to better adaptation to consumer demands and satisfaction.
Spatial Dimension	
<u>Geographic and Spatial Delimitation; Geographic and Spatial Proximity</u>	The factor indicates the built-up area, the spatial and geographical limits within which the actions will be performed, and boundaries considered when organizing and coordinating the cluster's strategies.

 Adequate Geographical and Spatial Conditions

Institutional Dimension

Promoter Agent; Government Support; Articulation; SMEs Composition; Cooperation, Collectivity; Democracy; Diversity of Organizations; Hierarchical Balance between Actors/Agents; Gains; Generation of Externalities, Synergy; Governance, Coordination; Innovation; International Market; Mutual Participation; Negotiation of Interests; Common Objectives; Transference of Information/Knowledge, Learning (Inside); Transference of Information/Knowledge, Learning (Outside)

Belief in Joint Success; Freedom of Action, Individual Action; Professionalism

The factor is immediately better disseminated by actions that may impact the whole cluster/APL in a planned and organized way, given the multiplicative importance of the factor, as can potentially affect other factors. The institutional dimension can collectively unite, manage conflict, transmit/share information, and affect the choices, appreciation, and transformation of development practices.

Political Dimension

No factors were revealed in the literature review

Political Communication; Political Partisanship

A primary factor of political impact on the influence and/or integrated participation of the actors/agents, enabling more articulation and proposal design.

Social Dimension

Social Capital, Social Cohesion; Trust; Strengthening of Social Ties; Inclusion of the Local Community

Social Competition (Inside); Social Competition (Outside); Development of Respectful Social Relationships; Commitment to Social Projects; Social Projects (Development); Social Projects (Donation); Recognition of One's Contributions

The factor is directly associated with the cluster's social universe, based on the social relations and ties, and the construction of socially common values, responsibilities, and benefits.

 Source: Elaborated by the authors.

We observed some conflicts between what is mentioned in the literature and what was revealed by the content analysis. The following factors were mentioned in the literature as being directly associated with the financial dimension: **SME Composition** (Lastres & Cassiolato, 2003); **Cooperation, Collectivity** (Dias, 2011; Olivares & Dalcol, 2010; Santos et al., 2004; Vecchia, 2006); and **International Market** (Dias, 2011; Lastres & Cassiolato, 2003; Santos et al., 2004) — they led to cost reductions, market expansion, growth in competitiveness and innovation in products and processes in companies. Nevertheless, according to the dataset, those factors can better relate to the institutional dimension, as demonstrated by the excerpts below.

That's the biggest difficulty [the relationships between entrepreneurs], I believe due to a lack of knowledge, this resistance, you see? . . . I rented it to three lingerie stores nearby. Then the people say: – You're crazy, opening for the competition? But I never think of people in my city as competition, you know? Because you see, one day my clients come to visit me and then buy at their stores, but [the opposite] happens too. And this misinterpreted idea makes them think I might want to take their space, so they stop participating in the same space as me. In the end, we become competitors, I don't even know how to say this, you know? But that's it, it makes them more closed, you see? [With a more competitive view] Yes! . . . [Where there could be cooperation] cooperation, that's the word, that's it. (Clothing production APL in Taquaral de Goiás, interviewed 7, 2017. The institutional environment requires work in order to transform competitive actions

into cooperative actions – **Cooperation, Collectivity** factor.

When are we going to open the way for banana exports? Are we going to wait until bananas from Ecuador get to Janaúba, and people start consuming bananas from Ecuador? That'll be too late, won't it? So, the way to exportation is a path that must be constructed, from what I've seen and observed. (Fruit growing APL in Jaíba, interviewed 1, 2017. Discussion proposal presented by the Association about the need to develop an export strategy – **International Market** factor.

Government support was mentioned in some studies as interfering directly with the economic dimension (Cassiolato & Szapiro 2003; Fochezatto, 2010; Schmitz, 1999; Porter, 2000) (São Paulo State Secretariat for Economic Development, Science and Technology/*Secretaria de Desenvolvimento Econômico, Ciência e Tecnologia do Estado de São Paulo* – SEDECT-SP, available from <https://bit.ly/37mly9U>, recovered on March 30, 2014; State Secretariat of Economic Development of Minas Gerais/*Secretaria de Desenvolvimento Econômico de Minas Gerais* – SEDE-MG, available from <https://bit.ly/3pDgCOx>, recovered on March 30, 2014); however, according to other authors, the government should promote strategies for all dimensions of development (Carrol & Zeller, 2012; Dias, 2011; Herrerias & Ordoñez, 2012; Lastres & Cassiolato, 2003; Marini & Silva, 2012; Marini et al., 2012; Molina-Morales & Martinez-Cháter, 2016; Santos et al., 2004). The institutional dimension is an intermediate capable of generating and interfering with local development because it can attract governmental participation and support and act as a disseminator of actions.

I got in touch with the State government . . . [And they told me]: – If you show us that there are conditions for the APL. [we can help you with support measures] . . . The conditions are cooperation between companies, a history of articulation and organization in the sector, that is, the existence of governance, people or entities [activities developed together]. (Software APL in Ribeirão Preto, interviewed 1, 2017. Exchange between the Association and the government in order to formalize the APL).

We identified **Generation of Externalities, Synergy** as a factor associated with the financial (Lastres & Cassiolato, 2003; Porter, 2000) and social (Alvarenga et al., 2013) dimensions. However, the institutional dimension was determined to be a direct generator of externalities. This excerpt demonstrates the synergy produced with the support of governance. Even those who do not participate in the actions enjoy the benefits indirectly.

Well, the ones that participated actively (of the APL) I'd say are these 40 which are associated with PISO, but somehow the actions are done . . . the other . . . companies, they benefit a bit from this collective knowledge, from the concentration of labor force here in the region . . . But in a direct way they miss out on benefiting from man benefits, which are the actual actions carried out [by those who participate]. (Software APL in Ribeirão Preto, interviewed 1, 2017.

Two other noteworthy factors are **Gains** and **Innovation**, which interfere with the society organized around the arrangement. The utterances complement the information from the literature about the **Gains** factor, which comprises the seven dimensions (Alvarenga et al., 2013; Bekele & Jackson, 2006; Fochezatto, 2010; Molina-Morales & Martinez-Cháter, 2016; Olivares & Dalcol, 2010; Sforzi & Boix, 2015); however, this factor is better categorized under the institutional dimension, since the capacity for coordination enhances and contributes to equalizing the gains. The **Innovation** factor had a direct economic association (Bekele & Jackson, 2006; Fochezatto, 2010; Lastres & Cassiolato, 2003; Olivares & Dalcol, 2010; Vecchia, 2006), but indicated practices focus on all dimensions, because it is necessary to innovate environmental, social, political, institutional, and territorial/spatial actions. Considering Cardoso (2014) and our data analysis, development can only be comprehensive by the immediate association of the **Innovation** factor to the institutional dimension, due to its ability to manage, plan, articulate, and disseminate actions on innovation in the various dimensions of development.

A lot [of the product is better than what was produced in the beginning] . . . It's acquired knowledge, it was beneficial to production, it was beneficial to the issue of using better products, and we became aware... of those things you used to see as... woow! [it used to be the best and now it isn't] . . . The other companies also started to see that change was necessary [obtaining new material]; otherwise it wouldn't sell. So, you know, knowledge, you see? This time it benefited both the production process and the improvement of the products. (Clothing production APL in Taquaral de Goiás, interviewed 7, 2017).

The excerpt above was mentioned in the part of the interview where we discussed how innovation is present in products and processes: directly economic, although these actions were the result of joint learning acquired through innovative transformations and actions, interaction, and sharing among those involved in the context of the experiences shared.

The **Professionalism** factor was allocated into the institutional dimension because, like the **Innovation** factor, it must demonstrate a range of interference with all dimensions, since it represents the improvement in both the professionalization of decision-making and the administrative processes and the professionalization of behaviors focused on professional and personal practices of collective coexistence, which are essential to the dimensions of local development.

After the factor-dimension analysis, it was possible to observe the dimensions that were mentioned the most: institutional (21), social (11), economic (8), and cultural (6). We found few factors related to the environmental (3), spatial (3), and political (2) dimensions.

Some observations are relevant from the research point, such as the low occurrence of mentions to factors of the political, spatial, and environmental dimensions. It is essential to give equal importance to these dimensions to focus on local development effectively. The economic dimension presented eight factors, a low number for a widely mentioned dimension in the literature. This number corroborates what other studies have discussed and concluded about the

undue weight that has been given to financial aspects when understanding development (Boisier, 2001; Brandão, 2007; Diniz & Gonçalves, 2005; Fochezatto, 2010; Fragoso, 2005; Iizuka et al., 2012; Marini & Silva, 2012; Martinelli & Joyal, 2004; Mattos, 2008; Oliveira, 2013; Olivares & Dalcol, 2010; Ribeiro et al., 2013).

The institutional dimension stood out and presented the most factors, confirming what the literature presents as a fundamental agent for successful actions: the governance factor (Cassiolato & Szapiro, 2003; Cunha et al., 2012; Lastres & Cassiolato, 2003; Lübeck et al., 2012; Marchi et al., 2014; Marini & Silva, 2012; Mattos, 2008). This factor can disseminate favorable actions. It can stimulate and implement cooperation, information exchange, and learning in a coordinated way with the development goals.

Allocating each factor into a dimension leads to a distancing from the complex reality of the arrangements because each factor interferes directly and/or indirectly with all dimensions simultaneously. The factor-dimension identification was an essential initial effort to help reveal the direct and immediate interferences and show both the dimensions generating the factors and the first actions that can influence these dimensions, a coherent effort to understand local development.

Final remarks

Clusters are some of the possibilities for (public/private) strategies for the development of regions. For the first time, our study revealed 54 factors, indicating their specificities and associations with the aspects encompassed by seven dimensions. The results contribute to understanding the elements that compose each factor and dimension and how these factors interfere with these dimensions, allowing for a better elaboration of development strategies considering environmental, economic, cultural, spatial, institutional, political, and local social aspects.

In this context, we found that the factor **Cooperation, Collectivity** and the institutional dimension were the “catalysts” and potential disseminators of actions promoting cluster development. The **Gains** factor demonstrated the need for greater commitment regarding the equity of the earnings generated, so that they are mutual. The uneven distribution of access to quality services increased together with the distance from and lack of involvement with actions focused on **Cooperation, Collectivity, Mutual Participation, Innovation, and Inclusion of the Local Community**.

It is important to mention our methodological limitations: (a) a qualitative approach, which considers the researcher’s perceptions of the respondents’ point of view (mitigated by the use of more than one data source); (b) Snowball sampling, which considers the social network of “seeds” and excludes other actors; (c) lack of diversification of the profiles of the actors/agents of the Software APL in Ribeirão Preto, in which only the group of managers related to the Association were willing to participate (although they were able to provide substantial information to meet the goals proposed here); and (d) the impossibility to generalize the data without due care, since a multicase study analyzes only specific cases in depth.

Recommendations for future research: (a) understanding the results for regional development when the factors and dimensions of clusters are analyzed together; and (b) analyzing

other arrangements in other regions and countries, identifying factors that compose the dimensions, identifying similarities and inconsistencies in comparison with the arrangements researched here, and from that, proposing a more consistent theoretical basis.

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Notes

1. We used a set of 5 pairs of keywords for each dimension, for example: (a) “*desenvolvimento local*” and “*dimensão espacial*” (in Portuguese); (b) “*arranjo produtivo local*” and “*dimensão espacial*” (in Portuguese); (c) “local development” and “spatial dimension”; (d) “clusters” and “spatial dimension”; (e) “industrial districts” and “spatial dimension.” The same pairs were used for the other searches, changing dimensions (cultural, political, institutional, social, economic, environmental).

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Conflict of interest

The authors declare no conflict of interest.

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