

Article

Theoretical Foundations in Support of Small and Medium Towns

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Abstract: This theoretical review aims to create a comprehensive and systematic analysis based on previously published literature explaining how contemporary technological developments may promote new paths for small and medium-sized towns (SMTs) and their networking systems. Much has been said concerning the capacity of towns to absorb strategic knowledge, which is highly dependent on local governance systems. In this paper, five levels of multidisciplinary approaches will be addressed so as to pinpoint the theoretical grounds for the promotion and advocacy of small and medium-sized towns (SMTs) as major drivers of regional sustainability: agglomeration advantages and networking efficiencies—representing strict economic accounting of cost and benefits; clustering in a context of online environments, and its extension to open networking systems; sustainable innovation processes for SMTs, technology, and knowledge transfer in open innovation systems—both settings for discussions within the framing of new technological developments and artificial intelligence; knowledge and new technological developments with local spillovers—to be enhanced employing new educational programs and learning diffusion at advanced levels; the social functions of small and medium-sized towns—to be addressed in the areas of sociology, architecture, and planning.

Keywords: small and medium-sized towns (SMTs); regional development; sustainability

1. Introduction

Setting the dispute in favor of small and medium-sized towns (SMTs) these days seems against the Zeitgeist of current urban and economic literature. However, there are some targeted efforts to clarify the concept and promote multidisciplinary research. To simplify uncertainties in the definition of SMTs and related terminology, we should explain that most authors do accept the integration of towns that vary in population between 5000 and 100,000 inhabitants into their classification. However, other concepts should be noted as to better integrate the urban dimensions within a broad geographic approach. We point out three distinct perspectives [1]:

- Morphological perspective: town is defined as a compact built-up area with a specific minimum population (urban settlement).
- Administrative perspective: town is defined as a territorial unit of local government that contains urban settlement(s) (urban municipality).
- Functional perspective: a town is defined as an urban settlement (or urban municipality) containing a concentration of jobs, services, and other functions that serve other settlements in its hinterland; the urban center acts as an urban core of the urban (functional) region, which is a larger area that contains the urban center and its hinterland that together form a socio-spatial system integrated by functional interrelations.

Current trends point towards the concentration within large urban cores, and an increasing amount of studies have argued for the symbiotic capacity of economic and geographic proximity [2]. Nevertheless, many SMTs nourish and actively foster vertices that promote livability, subjective wellbeing, and a recent tendency of a generation demoting to a simpler and more rural life. Before our technocentric age, the survival of such structures was questionable as they did not assure either agglomeration economies or the related energy savings of industry and services, nor did they consider the capacity of knowledge transfer and spillover effects that harvest, over time, the chance of generating cost-efficient spin-offs within more rural settings.

However, there are many different reasons to confirm that these views are questionable not only from a theoretical point of view but also from an evolutive perspective. It is not easy to put together those necessary foundations confirming the recent trend within a literature context which, for long, has prevailed in its concentration and favored the establishment of studies based upon positive agglomeration factors. The truth of the matter is that all the negative social effects, such as the massive concentration of power in the building and construction sectors, the abnormally rising property prices in big cities, as well as the social discrepancies ascending in mega towns and cities, have never been pointed out by most of these studies. The lobby of civil construction in cities and mega towns has slowly emerged and dominated their urban and economic structures, impacting most of our lifestyles. Unfortunately, one of the best examples is the incommensurable negative effect of agglomeration economies that are now being observed through the impacts of the COVID-19 pandemic, which has been spreading too fast in most of the biggest urban areas with catastrophic effects and incommensurable long-term, negative economic and social externalities.

Nowadays, the regional dimensions of spatial and temporal interactions are changing [3]. Dispersion will likely not have, in the future, the same costs as it used to have in the past. Smarter cities, and their inclusion in networks of health [4], education [5], retail [6], and transportation [7], may suggest that geographical distances will become less relevant. This is also further enhanced by the human pursuit of other values, such as spirituality, nature, and travel. Of course, such determinants of future human behavior are uncertain, and any assumptions based upon such eventually forthcoming developments are uncertain. Nonetheless, there is a trend to look at small and medium-sized towns as the only existing instruments to sustainably keep nourishing our whole territories, especially the rural ones, with a new vision that prepares humankind for an era of post-capitalism.

The current discussion on how to sustain SMTs is complex [8–10], and clarity concerning the adequate strategies for their prosperity remains scarce. It is uncertain how these investments will lead to returns sooner than expected given the low margins for profitable activities. Leveraging the agri-food industry and tourism, in search of better skills related to information and communication technologies (ICTs), is a possibility [11]. But there is not much that can be done in such towns at present. Still, the future could reserve some good surprises if incremental local knowledge is incorporated in the most adequate tools provided to and from policymakers [12].

The structure of this contribution is composed as follows:

- 1) This introduction justifies the interest in the topic and its theoretical construction and how the research was elaborated. We present the relevance of the chosen topic and the structure of the manuscript, in which we try to pass our main message, also supplying information on the concepts and definitions of small and medium-sized towns and why it is so important to study them.
- 2) Following the introduction, a theoretical construct describes the problems, mostly derived from a long-lasting vicious circle of agglomeration advantages and networking efficiencies concentrated in very restricted urban areas of higher dimensions, and call for the instruments to achieve a better regional balance. These are pointed out as open innovation and smart specialization. Within this very same theoretical context, a strategic view is suggested to support public policies and, much further within the context of a positive approach, we emphasize possible results, both short- and long-term ones. Due to this theoretical approach's novelty, we must not escape a robust discussion, separated from the very last argumentative points: results and the conclusion.

- 3) Methodologically, our conceptual arsenal uses classical and recent concepts to justify the need for support of SMTs as described in some subtopics of this paper: i) agglomeration advantages and networking efficiencies: hope in open innovation, ii) online clustering and extended open networking systems: small highly specialized towns, iii) sustainable innovation processes for SMTs, technology, and knowledge transfer in open innovation systems or public support to successful small clusters, iv) knowledge and new technological developments or better opportunities to all, even the smaller ones, and v) the social function of small and medium towns or a must-do for democracy and prosperity.
- 4) Those significant theoretical contexts interconnect in terms of path dependencies and future trends and are pointed out in the discussion.
- 5) The conclusion resumes the article, thereby emphasizing the role of public policy in the development of such urban structures.

We very much hope to be able to justify that, by writing this contribution, we are advocating and supporting SMTs across the world. Our paper supplies the first set of organized arguments to create a basis for promoting this. Although distance still matters for agglomeration economies, this factor will become increasingly less predominant in the natural path of economic development. Two simple reasons serve the purpose of a justification: Firstly, the concept of distance alters profoundly with technological progress. Secondly, the social externalities of agglomeration may reach a state of saturation for which they will become steadily negative.

Since our discussion is not based on quantitative analysis but a set of rational arguments, we are unable to supply a traditional quantitative framing with a hypothesis followed by a demonstrative quantitative model for its posterior confirmation. Instead, our major contribution is that our discussion follows a path based upon goals of a balanced endogenous development as a result of the empowerment to towns, showing that they may have already or must get the capacity to acquire, transform, and diffuse specific skills and knowledge across their well-defined networking systems. It does not matter if the specificity is related to tourism, technology, maritime clusters, agri-food, fashion, arts, AI competences, or any other specific areas.

1.1. Theoretical Construction

1.1.1. The Problem: Agglomeration Advantages and Networking Efficiencies—What Can Be Learned from Open Innovation

The fundamental theoretical framing starts with recent statements from two established regional economists [13] who in one of their recent publications mention that due to supply-led development interventions, these recent efforts to achieve regional balance have failed in many European peripheries and are now demanding long-lasting support. Indeed, regions across southern Europe can be mentioned as having reacted quite slowly, if at all, to most of the substantial supports given by the European Union during the last three decades. A recent publication goes to the extent of mentioning these regions as “places that don’t matter”, demonstrating how their actual lagging-behind is influencing the political outcomes across the world [14]. For us, a thorough discussion about small and medium-sized towns, their fatalistic role in the process of growth and how they should be directly interfering in the development debate, with their own agenda, is not only urgent but also fundamental for democracy.

For several decades, these kind of small agglomerations have been dealing with an unfavorable theoretical context that pronounced them inefficient and unproductive [15], neglecting their social value and the future of technological transfer which can alter much of the past trends of their slow developments. So far, the logic of the argumentation has been straightforward: the combination of agglomeration advantages, density, and transportation can facilitate the merging of labor and the sharing of infrastructures for suppliers, decreasing global costs for public, and private investments in most activities. The evidence shows that most of the learning processes, knowledge, production of innovation and its distribution created much higher comparative advantages in large cities than in small

towns. Thus, much higher profits for businesses from their location in these centers. Transferring people into such dynamic and efficient places became a goal of place-based policies whose mainstream targets still consist of the allocation of resources in the best possible way as to satisfy the growth of large urban hubs [16,17]. As we are trying to find out a theoretical foundation to call back the importance of SMTs, we ask ourselves if our challenge is an outdated effort or a post-modern brave alternative.

Marshall, as frequently referred [18], pointed out to three specific positive effects resulting from the agglomeration of businesses upon productivity: the use of local non-tradable inputs, the supply of specialized labor, suggesting an increasing demand for skills and, finally, a positive impact for the region from knowledge, the knowledge spillovers. After this initial step, most of the following theories have claimed that specialization promotes accumulation of resources and returns while market forces lean towards focusing investments in those areas which guarantee easy access to infrastructures and markets, as well as to human capital. Certainly, the environmental conditions for business may constitute the major initial advantages that the bigger city offers to an initial industrial cluster [19]. Then, the natural order of things suggests firms' attraction calls for more business, new organizations, and more resources. As stated by Lowe and others: *The interaction between the existing agents and the new entrants, create dynamic effects that are based on the growing knowledge and resource base of the location and a developing of horizontal and vertical linkages. This 'resource' starts to attract new entrants and provides strength to incumbents. Over time, institutions emerge that capture knowledge and support economic activity. These institutions can be leveraged and assisted by public support, whilst their effects are a result of individual transactions and market forces.*

This sort of attraction of business to business promotes increasing specialization and asks for relationships with other clusters for complementarities. If clusters are successful, they may link to other regional clusters and join in complementary activities for the global value chains. But as the process of innovation evolves, we can observe that open innovation represents an increasingly significant share of new products for which actors such as investors, companies, universities, customers, and other organizations cooperate in a complex form with new ideas, transferring them often throughout institutional limits. It has been confirmed [20] that the evolution from a closed regional environment to an open interregional system resulted from a progress of the economic activity into complex technological regimes for which technological learning, coordination systems, entrepreneurial strategies, and institutional regulations could enhance better business attitudes towards innovation, significantly dropping the traditional linear model of innovation. Certain is that until recently, innovation could profit from geographic proximity [21] due to easier flows of tacit knowledge and some frequently unexpected interactions crucial for the innovation process.

So far, we assume that the previous explanation does not cause many doubts or criticisms. However, in the last few years, so much has changed in the form of how open knowledge is diffused and absorbed, and how information and data are exchanged, that individuals and firms mix continuously and unperceivably in the process of open innovation. The production of ideas and solutions emerge naturally, mainly from the global open space—an ideal “local” non-geographically defined space. There, in the middle of nowhere, the free exchange of information, ideas, and solutions occurs and exposes an almost unlimited amount of tacit and codified knowledge, trust and relationships at global level. It is a golden reservoir of knowledge and ideas open to all, and, yes, indeed, independently from geographical proximity.

However, it should be asked where the magic key to detain advanced skills nowadays is becoming the most fundamental positive externality in the open innovation process. More than a decade ago, authors [22] confirmed that localized face-to-face interactions between partners were a significant positive externality for which links such as conventions, language, personal contacts, codes of communication and history could take place and consolidate trust or reduce risk. This justification has been used throughout the last decades as a major reason to justify innovation happening locally with benefits diffusing along with productivity gains and clusters representing most of the features of the modern innovation processes (reduced scale innovation systems). However, more than a decade after

the publication of this and other similar articles, it seems that we are facing important technological and subsequent socio-economical alterations, questioning the previous conclusions. Mentions were made [23] to the market potential given by both its size and density, and that such would represent a basic asset, such as the infrastructures, for the successful businesses: the setting of households and organizations reinforce the innovative process with positive externalities, and over time, the infrastructure builds up the basic conditions for prosperity.

Although the previous argument remains valid for growing efficient regions, the truth of the matter is that the market potential for certain very specific services tends, increasingly, not to be spatially located, neither from the demand nor from the supply side. Many services such as data analyses, marketing, design, software development, artificial intelligence, remote sensing, security, learning, financing support, management, and related complementary tasks/services can, nowadays, be provided instantly and/or transported cost free from distant locations. In such cases, the most important factor is that clients must be aware in detail of the services provided, trust their quality and be able to follow a clear and well-defined contract [24].

In our opinion, two major conditions for this are required: a. specific and competitive advanced skills to offer and b. trustfulness, meaning the ability to rely on a clear and fully compromising contractual agreement. Once such major characteristics are incorporated in a business relationship, the practice can be extended to any other exchange of similar type. The evolution of a networking system based upon such characteristics is limitless and extends over space at a global scale. We are now describing new opportunities that create positive advantages for many businesses and many independent workers that are nowadays fitting into a segment of the productive chain. Particularly, in services or in the ICT segments, allowing supplies from far and within a noticeably short timeframe to clients at the end of the chain or, in most cases, to any other intermediary stakeholders.

Under such circumstances of increasingly segmented markets linked by standardized contractual rules and connected by informational flows and low transportation costs, the concept of space and time must change. There must be an impact on the location of production factors, namely on specialized skills. Those strategies for networking, once able to change the interrelationships of sectors and their organizations, may determine new levels of specialization of many regions or towns, even for the medium or small ones. Any context promoting the empowering, concentration, or enhancement of highly specialized skills has great opportunities for victory across the world, providing the conditions exist, such as intelligent marketing strategies and recognition and unbiased evaluation of the quality of the skills. In this regard, regional and well-equipped small universities and advanced institutes may well serve this purpose. To better understand the focus of our discussion, we wish to revisit the most significant literature:

1. Most of the valid arguments for the dynamics of territories are based upon the positive contributions of innovation, either because of the new forms to explore natural resources, recreate existing or new infrastructure, promote the existence of R&D institutions, or because new skills emerge [25].
2. A better understanding of the drivers of innovation stimulated researchers to adopt the resource-based view of the firm, meaning that once the heterogeneous character of firms and their unique choices were accepted, the strategic behavior of firms determined most of the strength of territories' capacity to change. In such a context, it can be confirmed [26] that knowledge becomes the key resource for firms and other economic agents.
3. Conditions for technological development are progressing so fast that our topic cannot be discussed without perceiving them and how these may intertwine with the future socio-economic structures and their locations. We are mentioning remote learning and working, new highly concentrated management forms followed by locally dispersing distribution circuits able to reach any product to anyone in a short time span.

1.1.2. The Instruments: Upcoming Integration of Information and Communication Technologies (ICT) and Artificial Intelligence (AI) in our Systems and its Dynamics and Consequences—More Rational Decision-Making, Specialization, and Connectivity

Literature on this topic refers to: a) AI strengthening markets as well as superstar companies, expanding the gap between specialized work and nonskilled labor, following the trend of most technologies related to information systems; b) In terms of firms' competition, the distance between those companies able to partner AI and those who will not, will accentuate in a logic of the "winners-take-it-all", and based on scale economies. Big companies such as Google, Facebook, Amazon, Alibaba, and a few others dominate the market of e-commerce and determine increasing asymmetry of revenues for all in a monopolistic context. The classical creative destruction, as defined by Schumpeter, will not occur as frequently and freely as today. Superstar companies use their networks, already dimensioned for scale, to enter new markets and re-design their competitive structure. They will assimilate in line industries into the same competitive bottlenecks they supervise. And, c) Otherwise, online clustering and extended open networking systems might favor small highly specialized towns (examples: Waterloo in Canada, Covilha in Portugal, Salzburg in Austria).

The co-location of producers, services providers, educational and research environments, public or private support institutions can be defined as clusters. We would argue that this same classification, if located in a non-random geographical agglomeration of population and firms, could eventually be defined as towns. However, a major distinction separates towns from clusters' (in the sense of its classical definition) dispersion of activities.

Clustering requires a set of firms with similar or closely complementary capabilities, towns do not. But only when such circumstances exist may towns observe the best conditions to prosper. So, in our opinion, much of the theoretical framing related to clustering ("Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standard agencies, and trade associations) in particular fields that compete but also cooperate" Porter (1998c, p.197). But, such as clusters, there is also huge diversity amongst towns: they are at different levels of prosperity, they belong to fragile or powerful networking systems, they may be sustained by key sectors or anchor firms such as tourism or a well-recognized university, their reason for development may be a simple long-lasting well-known event.) could be applied to the concept of flourishing towns and, note, these do not necessarily are represented by town size but by their specialization and interconnective level fostering their location around historical and path-defined places of specialization. If we follow the concept of clustering as a base to better understand the conditions for a town to survive or, even, to progress, we must accept that most of the existing economic activities are innovation-dependent and frequently highly focused, requiring research institutions and specialized suppliers of goods and services.

Thus, the dynamic change of the economic basis for a town, be it a small or a medium-sized one, must result from its geographic location and concentration of activities, as a primary factor, and, secondly, from the achievement of competitive advantages towards the other urban centers. Any technological change occurring must be reinforced by integration in the global economy, meaning, in other terms, that any circulation of knowledge in the form of an innovation system has the key to potential benefits or, in other words, knowledge diffusion and spillover mechanisms must surpass R&D investments to achieve the link of R&D–urban prosperity. So far, we have emphasized both the specialization and the location to justify the capacity for small and medium-sized towns to prosper, along with suggesting how the future is keeping great technological advances concerning speed and connectivity between people and business. Within such an emerging context, it sounds hard to accept that the validity of the universal "principle of locality" might not be questioned. Of course, "the physical space à la Newton" remains unchanged: populations, housing, infrastructures, natural resources, coastal areas, and climate change are unquestionably geographically located. However, parallel to this, a new, virtual geography is intensifying and grounding most of our current activities: work, trade, science, investments, innovations, and technology.

This reality has prompted new concepts, some even already surpassed. For example, several researchers [27,28] have investigated the traceroutes of the overall Internet use, based on inter-city digital (IP) links during the period 2005–2008. They have confirmed that the cyberspace depends on real world's fixities found in a concrete cyberplace. The results on the nodes' degree distribution of the Internet offer arguments to believe that the Newtonian distance friction effects and the population masses play a major role. Besides, it is confirmed that various proximity indicators play a role as well, [29]. The IP connectivity appears to be higher between neighboring regions in terms of physical, technological, organizational, and institutional distance. Certain is that the digital communication patterns are not necessarily subjected to Newton's universal gravitational principle in a physical world and much of the justification for the observation of such principal in the virtual world is based upon the fact that internet access was restricted by distance, indeed, but tends to become, in the future, increasingly accessible to most of the world's population. Once big business correlates consumption increases to free Wi-Fi, no restriction to its use will exist.

Of course, there is much more to company location than this narrow argument. But we ask further why company location under such technological advances would continue to be in very expensive urban centers when locational costs still count, and increasingly more, due to strong impositions in cost reduction to readdress fast need to grow technological innovation?

What we have seen so far, during the last decade, is a continuous process of industrial disaggregation spreading around the low-cost areas and services reducing, as much as possible, their fixed costs in both rentals and salaries by dropping their locational areas and allowing less working times or home office hours to their employees. Thus, we question if the "Tobler's First Law in Geography" [30], when referring to everything and not only to physical matters, remains valid in a future digital world. We are not referring to the complete disappearance of the hypothesis of the "death of distance", as there are still some important assumptions that hold, such as the stability of geographical settlement patterns.

Given the great heterogeneity in our socio-economic geographic landscape, much has been discussed if ICT access and use will reinforce, or not, the unequal spatial benefits emerging from the digital world. It is difficult to conclude a definitive statement that refuses or confirms that in a digital world, location and distance do not matter. For some authors [31], the "First Law of Geography" is confirmed, and it seems plausible that in a digital space economy, location and distance matter more than ever before. But we suggest waiting to see, since long-term analyses cannot be made while ICT developments such as cyberspace are improving so fast. In our opinion, if distance will not approach its minimum value, which of course cannot happen due to its nature, at least, the decrease of its importance regarding other locational factors is to be expected. We may not ignore that relational and networking factors increase the value of our practices and services wherever we may be located. So, back to the title of this argument, clustering in a cyberspace context is possible and matters, and it will increasingly help the production systems to improve and extend out of their physical borders, thus opening new opportunities for non-central urban areas to prosper as well.

1.1.3. The Strategy: Sustainable Innovation Processes for SMTs, Technology, and Knowledge Transfer in Open Innovation Systems or Public Support to Successful Small Clusters and Specialization

There is a major difference between innovative processes occurring in specific contexts, be it sectorial or entrepreneurial, and sustainable innovation processes that tend to occur in the context of geographic or industrial systems. These last processes are those we are more interested in during this discussion. They include involving entrepreneurs, policymakers, universities, and other stakeholders, contributing to the expansion of tangible and intangible assets, often with the aid of public funds. Thus, business activities of unique nature may boost regional economic environments and local social contexts, including their institutions and capital, thereby taking advantage of economies of scale or opportunity, internal and external, and frequently even promoting the entrance of new businesses. Impossible? No, just difficult but less difficult than previously. Within successful clusters, sustainable

innovation processes not only create their resources, institutions, and potential but are also able to attract further assets into their dynamic systems such as financial capital, labor, and entrepreneurs from other functional regions or populations due to the environments they may be able to generate.

Still, there is no guarantee that the clusters that once have developed well in the early stages, will continue to do so subsequently or when industrial trends alter. From the moment entrepreneurs start their business and acquire resources and market potential, they become a crucial factor in the dynamic process of the formation and development of a cluster. Very often, new companies are created in places where entrepreneurs live and where they established commercial and social networks, along with the access to a market of potential customers as well as to a potential supply of inputs.

Moreover, if innovative results from clustering do not spread into the town's economic activity as well, from the local point of view, the public supports to the urban context risk becoming fruitless. So, in our view, there is a very similar dynamic between the successful clustering and successful growth of SMTs. Mention being made to the fundamental role of public policy in this last context [32] and explanations of the emerging, new paradigm of rural development, the pools of rural excellence which demand public policies for territorial innovation, intensify competitiveness towards economic improvement by fostering business. Some intervention models, such as strong investments in infrastructure projects with direct economic relevance, act to promote localized business and inspire joint initiatives between public and private partners, agreements to reinforce partnerships between "producers" and "consumers" of knowledge and technology, for example, do encourage even small contexts, in our case small or medium-sized towns, to have technology and knowledge transfer as well.

From a systemic point of view, a town comprehends a regional knowledge base and an innovation system, small but with a constellation of stakeholders and actors possibly associated and related to other technological systems. Some studies, such as [33] or [34], have suggested that the diffusion of knowledge is most effective if organized as an interactive system, which many regions lack. Technology and innovation are not created in isolated organizations but rather in favorable environments, where competent organizations and skilled individuals interact in a constructive and complementary way to assimilate existing knowledge and generate new ideas, products, and production processes. It has been argued that firms and research centers of expertise/excellence play a dual role within a region, both creating (or co-creating) knowledge and absorbing knowledge from outside of the region.

The earlier arguments demand a deep reflection on a frequent challenge to small and medium-sized towns, mostly embedded in small networks of power and restricted governance connections. Let us emphasize that there is no possible application of the earlier mechanisms if the local power is impregnated by regional endogamy—hereby defined as a progressive network of connections and interests restricted to a geographical area, short in external inputs, intensifying in multiplication of internal roles and tasks, but never opened to different solutions found in total different environments. Many small towns integrate regional closed networks, refusing to open, and do apply those actions required to consolidate regional endogamy. They may even prosper slowly but, with time, they finally prove to be unable to follow the global needs and challenges. In other words, regional endogamy generates a serious obstacle to the evolution of sustainable innovation processes, from a closed regional environment to an open interregional system—a major condition for the sustainability of SMTs in the global context has been confirmed [35]. Subsequently, innovation and entrepreneurial behaviors, as well as governance systems and leadership, have important impacts on the prosperity of small and medium-sized towns but are much influenced by proximity conditions as well. In our theses, our major question is: Which proximity is here in question? The geographic proximity or a virtual, remote proximity stretched by the control of virtual reality?

Wealthy and large urban agglomerations are locations where knowledge transmission is likely to be highest, thus areas of more intense entrepreneurial activities. Knowledge spillovers take place if the knowledge created flows further, bringing external advantages to business and society. Such positive externalities may be remotely transferred, thereby decreasing the spending on R&D investments. Related government public policies may increase innovative activities and spray further

such knowledge spillovers and their respective effects. Observing, for example, the evolution of art/cultural capitals creativity clusters one may perceive that in due time, some industrial clusters are overtaking other clusters in the same spatial context and benefiting from previous institutional environments, early traditions, and/or existing knowledge. In such cases, policymakers should address visionary actions to upgrade their hometowns and cities.

Knowledge spillover effects may last in time, and that could be halfway to justify the path dependency of certain places. This issue is of extreme importance for stakeholders seeking to overtake other regional clusters as firms have a strong motivation to locate in pre-existing clusters [36], facilitating the absorption of the above-referred advantages. Also, other authors [37] argue that entrepreneurship resulting from knowledge spillovers tends to be geographically located close to the sources that currently produce the relevant knowledge, but they also tend to be increasingly virtually connected. Considering that the citation above has been published more than a decade ago, we must accept that open innovation in recent years has mostly altered the effects of located spillover effects, addressing them also across the globe and to individual small firms. Eventually, this may concentrate or virtually connect to create solutions to specific problems. Our society has changed, and we face times of open cooperation and knowledge sharing.

Many authors may still support the existence of regional innovation systems (RIS), defined as [38] systems in which companies and other organizations are steadily involved in learning interactions, through a regional cooperation network, institutionally formed. Though we must emphasize that today, a regional cooperation network should not be selective but rather open to as many collaborations across the virtual world as possible, tending to scientifically progress from the evolution from a closed regional environment to an open interregional system and further to an open wide world sharing knowledge.

Or, to emphasize the preservation of basic conditions in this process: “The economic success of each country, region or local shall depend on its ability to specialize in the effective and dynamic comparative advantages arising from its collection of attributes and skills . . . the innovative process depends on two dimensions: the business ability to promote research and development, the identifying new products or processes that ensure the economic success of the companies, as well as the local capacity to learn to create an atmosphere of change and progress” [39].

Under such circumstances, the public sector is far from being a passive actor, conditions such as supporting infrastructures, including incentives for the creation and operation of networks, training human resources, as well as improving communications and good quality of living are all dependent on the public political strategies and subsequent investments.

1.1.4. The Short-Term Results: Knowledge and New Technological Developments or Better Opportunities to All, even the Smaller Ones

Some innovative ideas and new products are being announced as results from such wide-open interactions which call new, sometimes even unexpected actors to the innovation scene. Whether these newcomers can integrate the market and make a difference remains to be seen. As we all know, the market implementation phase is one of the longest and more demanding in terms of global links. Thus, it will not be surprising that many of the recent innovations, developed by small disperse entrepreneurs and research contexts, will be acquired by established companies to advance with the posterior marketing circuits. Partnerships may develop, occasionally in the spirit of a shared economy, but not much has been referred to this in terms of geographically located tendencies. To illustrate our discussion, we have searched for some inventions that have resulted from efforts of dispersed innovative trials in small businesses across the world and have the potential to alter much of our quotidian life, thereby able to reach some substantial marketing share. In these cases, location did not played a major role in the arising of such creative ideas as they have origin in individual efforts or very small companies, most of them resulting from the need to survive under stress or strong restrictions: light from water bulbs, biodegradable pills of water, trash removal powered by solar energy, plastic-free shampoos, turbine free generators, recycling trash for many different uses such as

road paving, shoes, solar energy applied to boats, edible silverware, portable turbines, toothpaste in pills, car tires recycling into new materials, coagulants for pure water usage in adverse environments, charcoal from excrements, biodegradable plastic, or biogas efficient containers are examples of diverse inventions ready to conquer the rising market of sustainable production.

In such cases, the knowledge to create has arrived from diverse skills, need, and diverse knowledge availability. No doubt larger companies will search for opportunities to put these new products on the market. Their location and productive centers may be in low-cost areas now that distribution and local markets do not require any specific characteristics of a global-wide demand. The truth of the matter is that innovative ideas may develop in diverse environments, supplying diverse needs and offering diverse benefits to diverse locals. Reading a recent report of the World Economic Forum (2019), some world-changing technologies are expected to crash the status quo: teleportation, humanoid robots designed to socialize with people or minuscule lenses that will pave the way for diminutive cameras, biodegradable plastics obtained from useless plant wastes, or DNA-based data storage systems that will reliably store massive amounts of information. In any case, all these are recent discoveries that may unexpectedly change completely our perception of distance and social connections.

1.1.5. The Long-Term Results: The Social Function of Small and Medium Towns or a Must Do for Democracy and Prosperity of All

Apart from the previously described socio-economic conditions for SMTs to prosper, one should not underestimate that quality living surpasses it all and expresses a holistic function. Some urban and regional studies earlier *focused* [40] mainly on larger cities and found there is a need to emphasize the utility of green areas in the architectural design so that the idea of well-being prevails. However, much less information exists related to small and medium-sized towns. Indeed, towns between 5000 and 100,000 inhabitants are reduced to such a lack of information related to their historical functions, their social capital, or their stronger social bonds. These urban centers vary immensely in their characteristics and capabilities and, thus, their force to redefine the position of SMTs in the global context also differs. Only a few scholars have participated so far in the narrow line of research about small towns, and consolidating could help to better understand the spatial and economic differentiation of small cities' trajectories. From a demographic and migratory perspective, the loss or gain of their economic functions from situations such as decentralization, locational advantages, or shifts in economic structures may affect SMTs' hidden forces and social values in an irreversible way.

A very interesting example related to the town of Bukoba in the region of Kagera, Tanzania, is suggested [41]. Its population has been tracked over the past two decades (1991–2010), including their migration patterns and the fate of everyone in the original (1991) households. This enabled researchers to examine in detail how many people moved and who fared best. As expected, those who made it to Dar es Salaam, saw their incomes more than triple; they all escaped poverty. Those who remained farmers in the rural areas also saw their incomes rise, but by only 60 percent. Those who left agriculture for the secondary towns or the rural nonfarm sector experienced a doubling of their income, with the share of people living in poverty declining from 64 percent in 1991–1994 to 25 percent in 2010. Yet, when looking at their contribution to overall consumption growth and poverty reduction, it was those who moved to the towns and their hinterlands who contributed most (42 and 50 percent respectively). There were simply many more of them who made it to these urban centers (one in three), while only very few made it to Dar es Salaam (one in seven).

But why are SMTs more effective at revenue distribution and increasing earnings for the poor? Firstly, from an economic perspective, labor demand forces and job creation seem not to favor smaller urban centers as firms take the most advantage from agglomeration, as earlier stated. But one should realize that most of the economic benefits from agglomeration are deeply tangled with the favoritism for big cities in such a way that economies of scale linked to many activities can already be taken at a much smaller urban scale. Further, it is not certain that the effects in the hinterlands are greater.

Research developed [42] suggests just the contrary. And it is not neglectable, the fact that to find jobs as you are better aware of the urban environment and the level of proximity is easier reduces transportation costs and time, as well as facilitates life support and quality management. There are advantages such as better links with the farms, family bonds that can be better maintained, and jobs that are also easier to reach, given lower transportation costs and better social linkages. Although the work offer is lower, jobs are more likely to match worker skills and expectations.

2. Discussion

Further to suggesting the theoretical framing, we should emphasize how the different determinants in support of SMTs promote a debate on the importance of SMTs. Undoubtedly, firms take the most advantage from agglomeration economies. When noting that most of the economic benefits from agglomeration are deeply tangled within the preference of big cities in a way that promotes economic activity specifically oriented to scale economies, we must question the true and real meaning of agglomeration, town size, and cities.

The interest of this work is based on a novel approach: not only the main ideas behind the strength of local areas are lower cost-driven and oriented towards a goal related to a better social life to improve interactions, but also the fact that sustainability does not require intensive use of materials and energy resources as soon as we understand that clean energy production is not concentrated. Further to this issue, the classical scientific arguments related to transportation economics are still of significant importance [43].

Population agglomeration indeed promotes the reduction of transportation costs, provided that technological development exists. What has not been architected is the change in the transportation costs' function as a result of open innovation and sharing economies, technological progress, and energetic supply tending to no charges. However, development studies tend to a classical and conservative approach until the facts take place, and empirical observation allows empirical data to sustain theoretical formulations.

The required public action to induce the creation of technological and innovation poles is necessary. It promotes that regional innovation systems and regional and local knowledge, in particular when driven by peripheral universities, have a clear and indisputable role in generating the endogenous capacity of SMT to emerge with strength and political empowerment [44,45].

Our theoretical framing changes the perceptions of the possible instruments by proposing a new way to understand the importance of peripheries and deal with small and medium-sized towns as instruments of redistributive progress. Redistributive progress is a social necessity and a concept that, sooner or later, will need to be seriously tackled by social scientists, planners, decision-makers, and policymakers. As path dependencies evolve, this argument becomes a political outcome in favor of democracy, one of the essential values in our societies.

Innovation intensifies when resources and knowledge exist and percolate in regions. The more agents are present, the faster the percolation takes place, and the more open innovation, especially product innovation. Considering the increasing relevance of process innovation, one may note that proximity starts to become obsolete, as knowledge transfer may very well occur at a significant geographical distance, instilling the notion that spatial distance might become less significant for process innovation.

The example of program development and its contribution to the innovation process with small companies producing in a fragmented and distant environment should serve as a good example for this argument. Two important points are noted:

- 1) The first one is the complementarity between process and product innovation forms and how each tends to be more or less determinant in the innovation process. It is difficult for less central areas to promote product innovation, certainly. But this is not the case for process innovation.
- 2) The second strong argument is related to public policy. Of course, it tends to concentrate more in areas where the investment has easier returns. Even in Europe, where the European Union tried

hard to reduce asymmetries amongst the different regions, there is no doubt that the winning regions have been the major cities.

In such contexts, mostly able to attract private and public investments, the increasing prices of properties adds to the appealing returns of investments. For example, in cities such as New York, Toronto, and Vancouver, the real estate market has risen to the point where an entire younger demographic can hardly afford real estate. It is clear that the large population density attracts business and eases high consumption rates, calls for skilled and highly educated labor, who are likely the ones who will be mostly participating in the innovation process. But the conditions of livability are very discussable, the social costs are very high, and the negative externalities are not duly evaluated. The recent COVID-19 pandemic spread in the major world cities should serve as another, a clear warning about the negative effects of excessive concentration. Also, it remains to be seen if 5G technology will not unexpectedly alter this trend.

One should also note the divergence of opinions to ours [46]. Nevertheless, these are addressed as follows:

“At some point, it will become necessary to explore more systematically the robustness of the conclusions drawn from a long string of empirical papers devoted to agglomeration (dis)economies and to the impact of transport projects. A large number of regional and urban economic models assume identical individuals and costless mobility, while transport economics often assumes that agents are fixed. These are signs of a poor understanding of the issue. A more realistic modeling of residential mobility costs would help one to better understand the evolution of spatial patterns. Most contributions also assume that firms and workers move together. However, it is far from being obvious that the mobility of firms and individuals obey the same rules.”

These authors call for new approaches in futures studies in transportation sectors exactly as we call for the need to integrate the new tools for innovation when modelling spatial dynamics.

3. Conclusions

Our analyses claim to observe new innovative processes and products as tools for development in SMTs. Furthermore, it has been emphasized that by promoting networking through the consolidation of the triple helix model of innovation, as well as increasing resilience, urban areas can reconsider structural functionality. These urban areas can recombine natural assets and innovation in more productive and sustainable ways such as, for example, the creation of new activities, clustering, landscape design, waste re-use, renewable energies distribution, and transportation.

Furthermore, significant results from our study point to:

1. Considering SMTs development as a contribution to territorial sustainability, thus a major goal of public policy.
2. As urban regions expand throughout the world, the adaptability and efficiency of small towns become increasingly relevant to mitigate environmental and ecosystem stressors brought by increasing urban sprawl.
3. In this sense, one might discuss processual innovation of small towns within three distinct functional specters of small towns of the future: (i) connectivity, (ii) growth, and (iii) technology.

These last three vectors support the following:

- a) **Connectivity:** Small towns offer the unique potential of abridging metropolitan cores with the efficiency of hinterlands and agricultural regions. This efficiency allows us to generate a multidimensional exchange of knowledge, economy, and the effect on holistic livability [46]. While strongly linked with transportation efficiency, particularly sustainable transportation, knowledge hubs may be created through codified knowledge of large central firms concerning ancillary satellite hubs in small towns. From a pragmatic perspective, this adds to the resilience

of small towns and articulates a more homogenous communication between central cities and hinterlands, and the most crucial aspect of the development of efficient regions.

- b) Growth: It is expected that small towns will similarly grow by the urban gravitational pull of large urban cores [47]. However, this growth may be planned and sustainable [48], leading to more diversified urbanization of both central cities and peripheral regions. Throughout the process of growth itself, small towns may work as a catalyst for sustainable growth achieving diversity of ecosystems, natural regions, and peri-urban areas of livability [49] and culture.
- c) Technology: With the upcoming usage of 5G systems, we are moving from a data-centric society to an information and knowledge centered technology. The mobility of 5G networks will allow enhanced technological efficiency to become ubiquitous and less dependent on the interaction of centralized knowledge economies. Between this structural, technological input, the Internet of Things (IoT) rises as possible propulsion for innovation and independent economic aggregators. Small towns may well be the cradle of future technology hubs. The central role depends on the innovation and engine of knowledge itself, rather than the traditional circuits of production.

Given these multiple vectors of growth and determinants of innovation for small towns, we are convinced that sustainable cities are a significant driver for the potentializing of smart growth [50]. A necessary asset for large towns to diversify in an already limited carrying capacity that is becoming depleted as cities grow. This paper showed an integrative approach to the importance of small towns, and the adaptability as well as the resilience of these towns in the larger picture of urbanization and knowledge societies. The corpus of research concerning small towns is, however, still limited. As societies reinvent themselves due to the increasing pressures of a globalized world, where examples as the current SARS-CoV-2 pandemic cater to the need for new strategies and integrations of functional regions, we must remind ourselves of the potential of small towns to interact with less population-dense regions. These knowledge societies will rely on the sustainable structure of the land, landscape, and territory [51,52]. In summary, it is time to emphasize the correct accountability of positive short-term agglomeration economies and long-term negative externalities resulting from progressive social atrophy that these cause upon small and medium-sized towns' territorial social equity and equilibrium.

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