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Exploring the potential of city networks for climate: the case of urbact

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ABSTRACT
Over the last decades, a growing strand of research has focused on the role that city networks play in local policy innovation and learning in the field of climate and the environment. In this regard, global transnational city networks have been at the core of the academic debate, whereas the number of studies investigating the European context and, more specifically, the networking initiatives supported or 'orchestrated' by the European Union (EU) has, to date, been limited. This article improves our understanding of how the latter type of network operates, and the extent to which these networks comply with expectations regarding their learning and capacity-building potential. By adopting social network analysis as a framework, we formulate and test a number of research propositions, and thus unpack the relevance and impact of the EU URBACT programme, which, since the year 2000, has promoted the creation of city networks as a tool for use in peer-to-peer learning and capacity-building in the field of sustainable urban development.

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1. Introduction

During the last decade, the role of networks in shaping local governments' climate strategies has been the subject of extensive academic debate, with a wealth of studies being conducted on the structure, functions, governance architecture, and effects of transnational municipal networks (TMNs) (Betsill & Bulkeley, 2004; Bulkeley et al., 2012; Kern & Bulkeley, 2009; Papin, 2020). How, and the extent to which, networks activities contribute to increased policy-learning and innovation processes have been at the core of this research agenda, although our knowledge of these issues still remains limited (Domorenok & Zito, 2021; Haupt et al., 2022; Heikkinen et al., 2020).

The European Union (EU) represents an interesting case, as it has proven to be particularly favourable ground for the creation of city networks, broadly defined as 'formalised organisations with cities as their main members and characterised by reciprocal and established patterns of communication, policymaking and exchange' (Acuto & Rayner, 2016, p. 1149). Unlike global TMNs, EU-led city networks are not bottom-up, but are instead 'orchestrated' by the European Commission, which offers the overall political framework and funding to support and shape the action for sustainability and climate change taken by local authorities and cities (Abbott, 2012; Bendlin, 2020; Gordon & Johnson, 2017; Kern, 2019).

Over the last decade, small and medium-sized cities that do not have consolidated climate policies have become increasingly proactive in city networks promoted by the EU, thereby challenging the leadership of large and capital cities as the 'pioneers' of climate governance (Kern, 2019; Reckien et al., 2015). This has largely been possible thanks to financial, institutional, and knowledge resources that EU programmes have made

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available to local authorities in order to support the development of local climate strategies (Bendlin, 2020; Domorenok, 2019; Reckien et al., 2015). Although the capacity-building rationale has been at the core of many of these initiatives, their effectiveness and impact cannot, however, be taken for granted (Domorenok & Prontera, 2021; Haupt et al., 2020). In this contest, a network architecture underpinned by a set of learning tools (i.e. jointly-designed policy guidance, benchmarking instruments and knowledge-sharing events) has been conceived of as the main driver of policy capacity-building, but little is known about the actual relations within the established networks that are actually expected to drive learning processes (Haupt et al., 2020). Thus far, the EU Covenant of Mayors (CoM) has been the most studied programme (Haupt et al., 2020; Domorenok & Zito, 2021; Rivas et al., 2022), while the functioning and impact of many other initiatives that have mushroomed over the last decades (e.g. the Reves Network, the European Green Cities Network, and Civitas) still have to be researched.

Against this backdrop, the experience of URBACT appears to be particularly promising in terms of understanding the relevance of networking as a means to encourage local policy-learning in the EU.[1] The programme's mission has remained unchanged since its launch in the year 2000, namely, 'to enable cities to work together and develop integrated solutions to common urban challenges, by networking, learning from one another's experiences, drawing lessons and identifying good practices to improve urban policies' (European Commission, 2022). To achieve this goal, URBACT has regularly called for bids to select, on a competitive basis, city partnerships (networks), established with the objective of enhancing the creation or exchange of local knowledge in the field of sustainable urban development through a range of joint activities that had to be in line with the URBACT policy priorities. Surprisingly, the programme's working and impact have been subject to very limited research (Briot et al., 2021; Duke, 2008; Haupt & Coppola, 2019).

The contribution of this study is twofold. First, it sheds light on the functioning of one of the oldest – but still under-studied – EU-sponsored city networks. Second, by adopting a social network analysis (SNA) approach, it elaborates on the relational features that are deemed to encourage learning processes within networks. Building on extant research and given the programme's rationale, we develop a set of proxies aimed at understanding whether, and, if so, to what extent the URBACT network has involved 'ordinary' cities (Haupt et al., 2022, p. 83), namely, 'small and medium-sized cities that are not high-profile progressive actors in climate governance', especially from Eastern, Central and Southern Europe, where local authorities appeared to be less equipped, compared to large cities in Northern and continental Europe to develop sustainability and climate strategies autonomously (Kern, 2019). Population size, GDP *per capita*, political leadership, and competences, have all been among the most relevant factors that influence local climate mitigation efforts (Reckien et al., 2015). We assume that the more the projects established within the URBACT framework engage with ordinary cities, the higher the programme's relevance will be in terms of local learning and capacity-building.

This article is structured as follows. Section Two illustrates the URBACT mission and functions, also explaining how it is believed to enhance learning processes. Section Three introduces the research design and methods, while the remaining sections present the empirical findings, which are then discussed in the concluding section.

2. URBACT: networking for policy coordination and learning

Most of the seminal studies on city networks have focused on global and macro-regional TMNs, analysing their membership (Bulkeley et al., 2012), their functions, and the way in which the collaborative linkages within these networks become institutionalised (Busch, 2015; Kern & Bulkeley, 2009). These studies suggest that networked architecture is conducive to the intensification of collaborative links and knowledge-sharing, entailing the creation of new forms of transnational climate governance, along with broader policy impacts (Bulkeley et al., 2012; Haupt & Coppola, 2019). Recently, an increased number of nuanced, but mainly qualitative, studies have been conducted on how TMNs generate governance innovations (Papin, 2020), encourage learning (Haupt et al., 2020), and facilitate the diffusion of policy experiments (Nguyen et al., 2020). However, systematic large-N research investigating the relevance of the established network architecture for the desired purpose has been limited (Haupt et al., 2020; Kern, 2019), as this entails multiple methodological and analytical challenges. The aforementioned gaps appear to be particularly significant in the EU, which has 'orchestrated' a number of networking initiatives aimed at enabling local authorities to build sustainable development and climate strategies (Kern, 2019; Kern & Bulkeley, 2009).

In this perspective, the URBACT programme represents an extremely promising case for study. It is underpinned by an explicit learning and capacity-building rationale, as described below, while, at the same time, providing financial resources and sufficient room to accommodate various local ambitions, expectations, and needs.

The programme funding is awarded upon a competitive basis to consortia that may be composed of cities, towns, research institutions, local agencies, and other territorial bodies, which form collaborative networks with the purpose of sharing the knowledge and expertise required to design or improve local sustainable development strategies (European Union, 2019, pp. 13–14). When applying for funding, the proposed networks must fit in with one of the URBACT strategic action lines, which are currently the following: (i) localising Sustainable Development Goals (SDGs), (ii) transfer networks, and (iii) innovative transfers. After its establishment in the year 2000, URBACT has aimed at (i) designing or improving the existing strategies, in which all the cities involved had to elaborate on a common policy problem and produce an integrated action plan to be implemented as a result of network co-operation; (ii) sharing the implementation experience of the existing plans and searching for innovative solutions; and (iii) transferring the acquired knowledge and experience about their attempts to be a 'Good Practice City', which acts as the network's lead partner and facilitator (European Union, 2019, p. 17). In order to deliver on this mission (European Commission, 2023), the established networks are required to draw their Network Roadmaps at the activation stage, describing in detail the policy challenges that the network is facing, placing it within the context of the EU's urban policy priorities, and setting out the network's customised exchange and learning methodology based upon the identified assets and barriers, as well as the complementarities between partners. The so-called Lead Expert (nominated and funded by URBACT) together with the Lead Partner play the key roles in this process. They are in charge of the baseline study process that precedes the preparation of the Network Roadmaps and requires them to visit and interview all the partners in order to develop the partners' profiles for the study, based upon local data, strategic priorities, delivery structures, related interventions, etc. Importantly, clear political support for the participation of the city in the Action Planning Network should be demonstrated by all the partners involved and should be investigated during the visits from the Lead Expert and Lead Partners. There is no preferred methodology for developing network activities. On the contrary, innovative and creative approaches are welcome. The only requirement for network participants is to 'demonstrate that a specific policy issues is addressed […] and a continuous flow of knowledge between the transnational and the local level for the appropriate application of knowledge generated during different network activities has taken place' (European Commission, 2023, p. 30). The list of possible activities includes, among other things, input from a variety of experts, site visits, peer-review exercise, and group problem-solving, while the knowledge coming from the aforementioned activities is to be collected and documented through briefing notes, learning grids and templates, short videos, peer-learning points, etc. Network partners are required to mobilise the appropriate resources and the relevant actors in order to implement the actions included into the plan, at least for the duration of the project. This architecture makes the URBACT network potentially accessible for any city or town in the EU, independent of its population size, geographical position, GDP, and/or other resources.

However, the challenging task of assessing the learning processes and outcomes generated by URBACT networks is beyond the scope of this research. Rather, our objective is to capture and unpack the network features that are expected to boost local learning for sustainability and climate.

3. Research hypotheses

As mentioned above, one of the main limitations of TMNs has been the fact that they have long been dominated by large cities from the Nordic countries, continental Europe, and the UK, which were led by charismatic leaders and possessed the multiple resources (i.e. knowledge, experience, and funding) required for developing climate strategies (Kern, 2019). Yet, evidence has been provided that the Covenant of Mayors

(CoM) has disrupted this trend by generating incentives for 'follower' cities to join, regardless of their limited previous experience and resources (Domorenok, 2019).

Similar to the CoM, URBACT has put forward the objective of enhancing local learning efforts through a range of joint activities (i.e. jointly developed manuals, collections of best practices, benchmarks, etc.). However, unlike the CoM, URBACT aims to activate intensive peer-to-peer learning, based upon interactions and instruments generated and supported *by* cities and *for* cities, rather than being guided from the top, as is the case of the CoM, where the European Research Centre elaborated templates, methodological guides, etc. to be used by the Covenant signatories. Moreover, when establishing URBACT networks, cities can choose from a range of relevant actions for sustainable urban development (for example, improving transport connections, green technologies, the labour market and employment, waste and pollution, etc.) and rely on EU funding for the implementation of their activities. Accordingly, we assume that the more the URBACT projects are inclusive, diversified, and led by ordinary cities, the higher the learning and capacity-building potential will be.

To capture the above-mentioned characteristics, we deploy Social Network Analysis (SNA) and develop a number of research propositions (RPs) that will help to improve our understanding of the relevance of EU-sponsored initiatives to mobilise local potential and learning efforts. Previous studies have shown that a lack of financial resources, expertise and experience were among the main obstacles to the participation of cities in TMNs, with this being especially relevant for local authorities from Southern, Central, and Eastern European countries (Domorenok & Zito, 2021; Haupt et al., 2020; Kern, 2019; Kern & Bulkeley, 2009; Papin, 2020). Also, city size has been deemed an important factor in their engagement in TMNs. Furthermore, large cities, with their more sizable economic, human, and relational resources, have been far more proactive in developing individual climate strategies, compared to their smaller counterparts (Haupt et al., 2020; Kern, 2019; Reckien et al., 2015). Accordingly, we map the URBACT network, distinguishing between small, medium-sized, and large cities, across the four geographic areas of the EU: North, West, East, and South.

RP1 Inclusiveness: Considering that URBACT offers financial support for the establishment and functioning of city partnerships, we expect URBACT networks to share a large number of ordinary cities, especially from Eastern and Southern European Countries.

The literature provides convincing evidence that larger cities have for a long time tended to connect with one another within 'élite' networks (Haupt et al., 2020), thereby fuelling the logic of 'pioneers for pioneers' (Kern & Bulkeley, 2009, p. 1). In addition, understanding how heterogeneous networks matter in generating novelty has been recognised as important (Papin, 2020, p. 2, 7), stressing that this process is facilitated by the very diversity of the backgrounds, interests, and views involved (Burch et al., 2018). Indeed, since, as Kern has emphasised (2019:, p. 126), system-wide transformation requires climate action in all municipalities, the interactions between leaders, followers and laggards are worth paying particular attention to. Interestingly, recent research has shown that, while searching for practical exchange, local governments 'aim to connect with cities facing challenges or that are considered frontrunners' (Haupt et al., 2020, p. 156). Accordingly, our analysis focuses on the nature of the interactions within the URBACT network, investigating the patterns of the connections between cities of different sizes and in different areas of Europe. The hypothesis that captures the above-mentioned dynamics is as follows:

RP2 Diversity: Given the variety of learning tools that URBACT can deliver and/or generate, we expect its large cities also to connect with ordinary cities, especially from Eastern and Southern European countries.

The role that cities play in the networks reflects how attractive and, at the same time, accessible the latter are for local authorities to participate in and commit to. While peer learning has been at the core of the rationale behind TMNs (Haupt et al., 2020), cities performing as lead partners for the URBACT networks play a key role in guiding the processes of knowledge creation and exchange. Accordingly, the more ordinary cities are proactive in leading the process of designing and running networks within URBACT, the higher the programme's capacity to boost local mobilisation and learning for sustainability and climate will be. While large cities once led TMNs, the URBACT capacity-building orientation offers the opportunity for small and medium-sized authorities to take the lead in networking activities by acting as lead partners.

RP3 Leadership: Considering the high mobilisation potential of URBACT, we expect 'ordinary' cities to act as project leaders.

We expect a social network approach to capture effectively the above-mentioned aspects by providing a nuanced overview of how the relational dynamics develop within the URBACT network, thereby shedding light on a range of the – so far understudied – features of city networks.

4. Research design and method: unpacking network functions and dynamics

Our research methodology is largely grounded on the so-called relational approach, which is widely used in the literature on governance (Bassoli & Cinalli, 2016; Sohn & Giffinger, 2015) and public policy (Christopoulos, 2008; Zhang et al., 2021). However, drawing on the extant TMN scholarship, we place a specific emphasis on networking dynamics in order to advance our knowledge of how policy-networks develop in the EU context, especially with regard to the 'by pioneers for pioneers' logic. We thus employ SNA to elaborate on the relationships between the cities participating in URBACT networks (Wasserman & Faust, 1994).

This research focuses on the total population of the city network projects (26), which were developed under the URBACT environmental domain during the 2014–2020 period. The data used for the analysis were collected from the official programme website as of June 2021 (European Commission, 2022). First, we created a detailed list of the networks' participants (165), as well as a two-mode institutional matrix, and then calculated the relative adjacency matrix (i.e. institution *versus* institution), leveraging the number of joint-projects that institutions share. We deleted those partners that were not local authorities, such as universities, thus defining the cities and towns involved in the URBACT projects from 2014 to 2020. The final sample is composed of 160 local authorities that joined the collaborative experiment within the URBACT project bids. For each city, we then identified and assembled a set of variables that were deemed as useful in running the analysis (i.e. the attribute matrix), distinguishing between the individual-city-level variables, which are part of the attribute matrix, and the network-level (URBACT) variables, which emerged from the analysis of the network.

Among the former, we have included the following: (i) being a lead partner, (ii) the number of projects, (iii) the type of city, (iv) the city size, and (v) the geographical position. Among the network-level variables, we used centrality and E-I index (Appendix 1). Performing as a lead partner is important for our analysis, as it indicates the high potential and motivation of cities to lead policy innovation networks. The 'number of projects' variable counts the number of projects which a Local Administrative Unit (LAU) has been involved in, from a minimum of one project up to four. The city 'type' is defined based upon the degree of urbanisation according to the DEGURBA (Degree of Urbanisation) classification system (Eurostat, 2021), to which we have added a fourth category: (1) cities (i.e. densely populated areas), with at least 50 per cent of the population living in urban centres; (2) towns and suburbs (i.e. intermediate density areas), with at least 50 per cent of the population living in urban clusters and less than 50 per cent of the population in urban centres; (3) rural areas (i.e. thinly populated areas), with at least 50 per cent of the population living in rural grid cells; and (4) collective LAUs. Our investigation universe is thus composed of cities (67.5%), towns (23.1%), rural areas (5.6%), and groups of LAUs (3.8%). When analysing the city size, in addition to considering the traditional population shares used by the OECD (2022) and Eurostat (2021) datasets (≤50.000/50.000-100.000/100.000-250.000/250.000-500.000/≥500.000), we focus on small cities, with less than 250,000 inhabitants, as they are expected to have very limited resources and, thus, limited learning and networking capacities. We then dichotomise this variable, creating a dummy variable that is coded as 1 when a LAU has a size of over 250,000 inhabitants and 0 otherwise. The 'geographical partitions' include four macro-regions: Northern Europe (Denmark, Finland, Norway, and Sweden), Southern Europe (Greece, Italy, Malta, Portugal, and Spain), Eastern Europe (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia), and Western Europe (Austria, Belgium, France, Germany, Ireland, Netherlands, and the United Kingdom).

As for the network variables, we used centrality and the E-I index. Building on the various conceptions of centrality (Freeman, 1978), we assume that, the more connections a node has, the more successful it will be in reaching other nodes and thus gaining access to information and resources. In our research, connections are reciprocated, and we consider two measures of centrality. First, *eigenvector centrality* is an index of exposure to what is flowing through the network. It is operationalised through the number of ties that an actor forges with others, weighted by the importance of the others. Nodes have high scores if they are connected to many nodes that are themselves well-connected. Second, *betweenness centrality* is about being a broker. It is based upon how often a node lies along the shortest path between two other nodes.

By using the E-I (external-internal) index (Krackhardt & Stern, 1988), we provide an account of the impact of the individual-level variables. The external-internal index is based upon the ideal of similarity, where *external* refers to the relationships between diverse subjects, and *internal* refers to the connections between similar subjects. Accordingly, if the E-I index is negative, the URBACT networks show a homophilic tendency (negative value), meaning that member cities tend to build connections between cities of similar sizes. If, instead, the network shows a tendency toward heterophily (positive value), this would mean that cities prefer to forge ties with cities of different sizes than their own.

Notably the negativity or positivity of the E-I does not tell us if the observed distribution of ties is different or not from a random one. To check this, a statistical test is needed. We thus run and E-I test based upon a permutation test using the dedicated procedure in Ucinet (Borgatti et al., 2002). The E-I test to assess how connections are actually distributed compared the theoretical situation of ties evenly spread within and between the groups. This index assesses the statistical difference between the actual homophily (i.e. the preference of actors for others similar to themselves) and the null hypothesis (expected value), which is that the observed value is due to chance alone and not a systemic cause. The E-I test has been repeated for various partitions (i.e. geographic and size partitions) to assess the relative importance of each variable.

Lastly, we suggest that the graphical output of SNA itself is also a valuable tool for use in tracing network dynamics, as it allows us to map all the connections under examination. In fact, Figure 1 summarises several networks characteristics that are relevant to our analysis. More specifically, the presence of a tie between two nodes, such as actor A and actor B, means that actor A is involved in a project with actor B. The shapes of the nodes provide another key piece of information: squares are used to denote cities with more than 250,000 inhabitants, while circles indicate cities below this threshold. The different colours represent different geographic positions: pink for the Northern cities, white for the Western cities, black for the Eastern cities, and blue for the Southern cities.

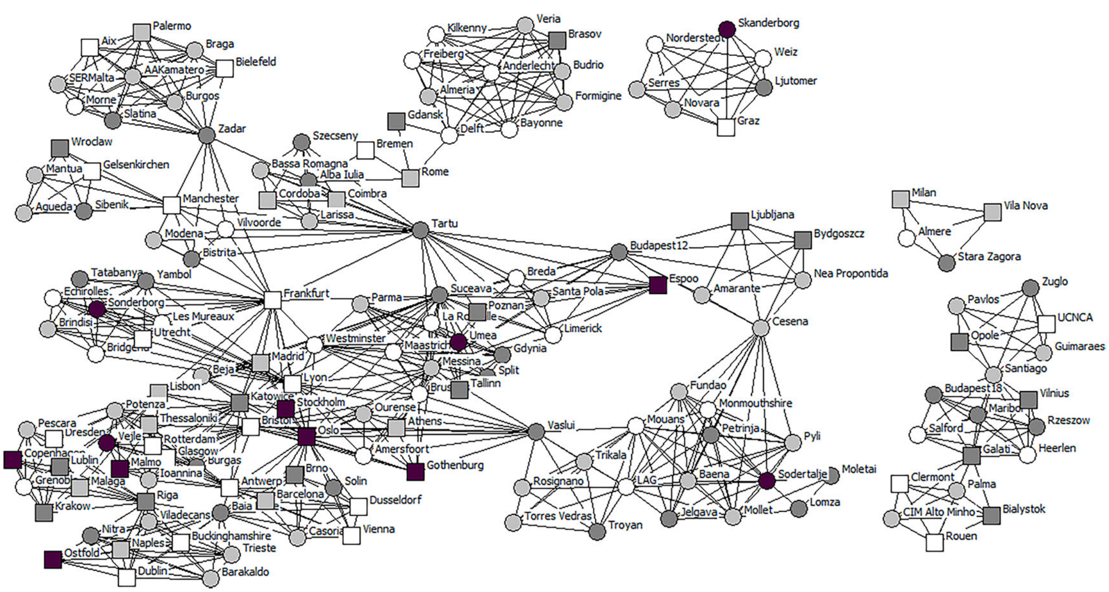

Figure 1. The URBACT network of cities (shape by population, colour by geographical position). Source: Author's elaboration based upon URBACT data and graphed with Netdraw.

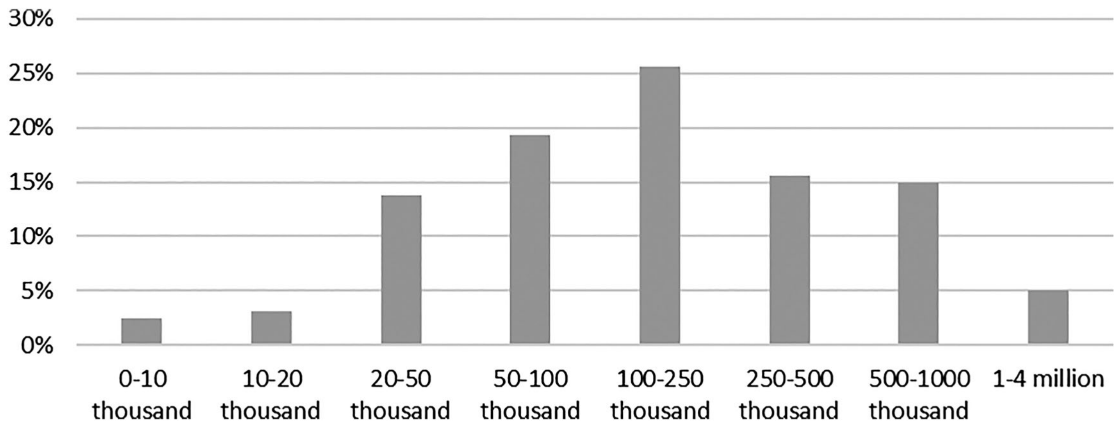

Figure 2. Population sizes of the LAUs that participated in the URBACT environmental networks (2014–2020). Source: Author's elaboration based upon the data reported in the URBACT database.

5. Analysis and findings

The first factor we suggested exploring in order to challenge the consolidated leadership of large and capital cities was the programme's inclusiveness, namely, the degree to which URBACT networks involved medium, small, and very small cities/towns. Building on the existing studies, our **RP 1** suggests that larger cities have major resources and are thus better equipped to benefit from city networks and/or act as lead partners, compared to their smaller counterparts, which may lack the financial, human, and relational resources to engage in, and, in particular, to co-ordinate, transnational partnerships (Domorenok & Zito, 2021; Kern, 2019). Considering that URBACT offers financial support for the establishment and functioning of city partnerships, we expected the URBACT networks to engage with a large number of ordinary cities, especially small and medium-sized cities from Eastern and Southern European Countries.

Our findings confirm the validity of the above research proposition. In fact, the number of cities with more than 250,000 inhabitants that are involved in the URBACT networks dealing with environmental issues (Figure 2) amounts to 36 per cent, whereas around 5 per cent of the network participants are very large metropolitan cities with 1 million inhabitants or more, which is the same as for the cities with less than 20,000 people. Interestingly, a considerable share of participating cities has populations between 50,000 and 100,000. In sum, small and medium-sized cities have been quite proactive within the URBACT network.

This trend is quite in line with the one observed in the context of the CoM, which is another EU-led initiative aimed at enhancing local climate commitment and knowledge through networking, albeit based upon a totally different operational framework and membership requirements. Similar to URBACT the CoM has mobilised a considerable number of small municipalities, with 66 per cent of its members having less than 10,000 inhabitants. Without considering the smallest one, as compared to the CoM, the URBACT network collects a more sizable number of medium-sized and large cities with populations between 50,000 and 250.00 inhabitants. These results hold, considering all CoM members (CoM_all), only individual members (CoM_ind), as well as CoM individual members belonging to the EU and the EFTA area (CoM_EU/EFTA) (Figure 3).

The trends related to geographic position develop in the same direction, with Southern European cities representing 35 per cent of the whole network, Eastern European cities accounting for 28.13 per cent, and Western ones amounting to 29.38 per cent of the network participants (Figure 4).

The aforementioned figures appear to be even more significant when compared to the universe of European cities. The majority (55%) of them are from Western Europe, with a sizable number of French *Communes*, followed by Southern and Eastern European cities, with around 23 per cent each. Cities from Northern European countries represent only 3 per cent. A chi-square comparing the URBACT distribution with the

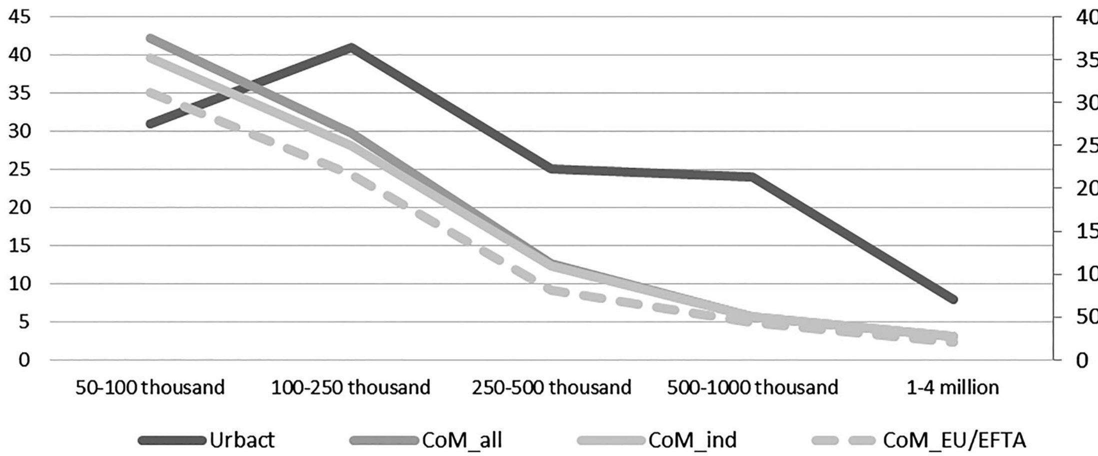

Figure 3. Population sizes of the LAUs that participated in the URBACT and in the Covenant of Mayors. Source: Author's elaboration based upon the data reported in the URBACT database and Kona et al. (2020)

European one suggests a statistical difference (X^2 (3, N = 160) = 81,6873, p = 1,3337E-17) mainly driven by Western European countries (Appendix 2, Table A2.1). If we run a control test by deleting France from the sample (see Figure 4b), the trend does not change (X^2 (3, N = 160) = 33,2916, p = 2,7954E-07). While, in the first case, the main driver is the incredible number of French small municipalities (see Annex 1), in this second case, the main driver is the activation of the Nordic cities (Appendix 2, Table A2.2). Thus, the overall findings only partially support the logic of 'pioneers for pioneers' because, as Figure 4 shows, Eastern and Southern European cities have been well represented in the URBACT network, and their engagement has also been significant when we consider the entire population of the local authorities in the selected macro-regions.

A similar picture emerges if we combine the two criteria under examination, namely, the geographical position and the city size. Given the high heterogeneity of the LAUs across countries (Appendix 1), when analysing the URBACT network membership, it is important to consider both the numerosity of the LAUs by country, and the concentration of large cities (see Appendix 1 for further details). By plotting the percentage of the LAUs involved in URBACT, compared to the total number of the LAUs in the country (left panel), as well as to those with more than 250,000 inhabitants (right panel), Figure 5 shows the notable capacity of URBACT to mobilise cities from peripheral areas. With regard to the former criterion, cities in Lithuania, Bulgaria, Ireland, and Slovenia, which are mainly small-sized and lie in the areas with GDP lower than the EU

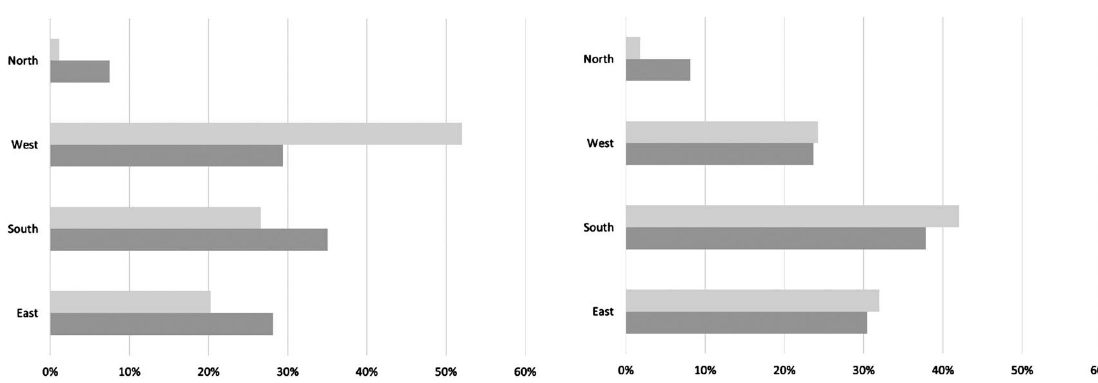

Figure 4. Percentage of LAUs in Europe (light grey) and URBACT (dark grey), all countries (left-hand pane), without France (right-hand pane). Source: Author's elaboration based upon the data reported in the URBACT database and Eurostat (2022)

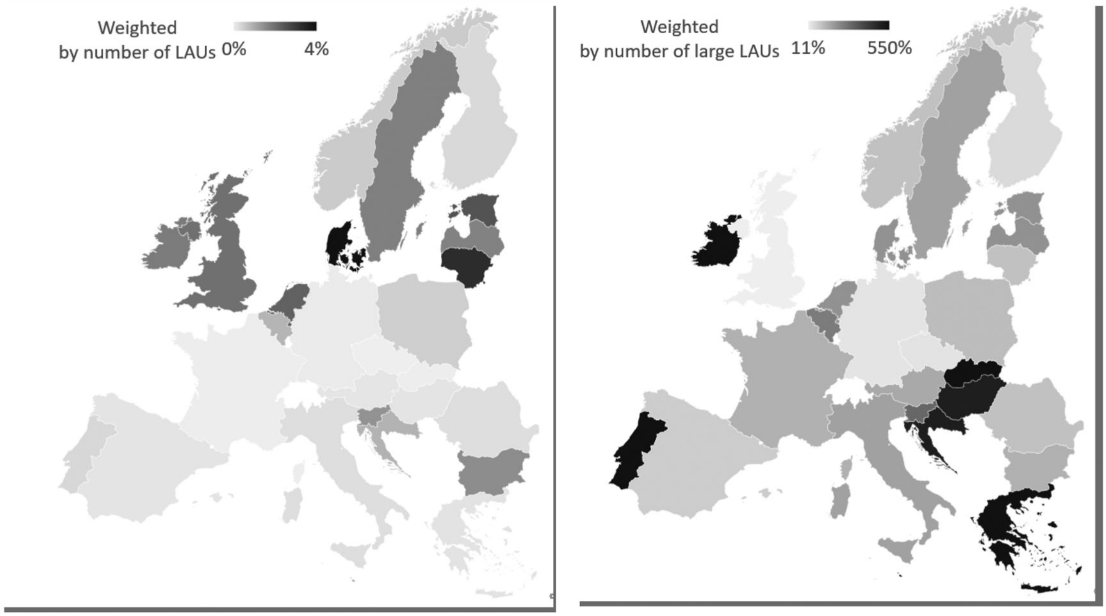

Figure 5. Percentage of URBACT member per LAU (left-hand pane) and per LAU with above 250,000 inhabitants (right-hand pane). Source: Author's elaboration based upon the data reported in the URBACT database and Eurostat (2022)

average, perform as actively as those in countries that enjoy higher levels of socio-economic well-being and have advanced climate strategies, including the UK, Denmark, Sweden, and The Netherlands. By the same token, cities from Portugal, Greece, Ireland, Hungary, Slovakia, and Croatia have been more proactive than their counterparts from the Northern and Western macro-regions, disregarding the small number of large cities in the former group of countries.

In sum, in line with the expectation reported in **RP1**, URBACT has contributed to activating small (such as Molėtai, Szécsény or Ljutomer with less than 25,000 inhabitants) and medium-sized (e.g. Alba Iulia and Zadar with around 70,000 inhabitants) cities from Central and Eastern European countries, including their peripheral areas, thereby outperforming large cities situated in Western and Northern European countries (such as Frankfurt, Oslo, Stockholm, or Vienna). These findings largely speak in favour of the relevance of URBACT as a system which supports the collective efforts of cities towards policy innovation and learning in the field of sustainable urban development.

The analysis related to **RP2** leads to further interesting findings, especially with regard to the relational features within the URBACT network. Given the variety of learning tools that URBACT may deliver or generate across local authorities, and considering the innovation potential of large cities, we have suggested that the more URBACT enables peer-to-peer learning mechanisms between cities of different size and geographic position, the higher the added value of its networking function will be. We have tested this proposition via the so-called homophily hypothesis.

As the analysis below shows, the E-I index is equal to −0.210 (Table 1), which indicates a tendency on the part of the participating cities to choose partners of similar size, considering that the expected value (−0.077)

Table 1. E-I routine based upon city size (threshold 250,000) based upon Ucinet (Borgatti et al., 2002).

	Observations	Minimum	Average	Maximum	SD	*P* >= Ob	*P* <= Ob
Internal	0.605	0.482	0.53	0.648	0.019	0.001	0.999
External	0.395	0.352	0.462	0.518	0.019	0.999	0.001
E-I	0.210	−0.297	−0.076	0.035	0.038	0.999	0.001

Source: Author's elaboration based upon the data reported in the URBACT database.

would indicate a rather small tendency towards homophily, i.e. the number of extant ties within and between the groups. The actual number is significantly higher than the expected one ($p < 0.01$), and, thus, in the URBACT network, not only does the partition based upon size favour a tendency towards homophily, but this tendency is also performed by cities deliberately. There is a strong preference towards cities of similar size.

These findings confirm that, within the URBACT network, small cities tend to connect with small cities proportionately to their number (first line, Table 2), while large cities mainly prefer to collaborate with large cities (third line, Table 2). Small and large cities do not have as many connections between them as they supposedly would have had if the ties had been forged evenly. This tendency is statistically significant ($p < 0.001$). Consequently, interaction and the related learning processes between small and large cities have been limited.

If we apply the same analytical angle to the geographic criterion, the results appear to be more mixed. As the E-I index is only one appropriate for bipartite vectors (i.e. dichotomous variables) and we consider four macro-regions in our analysis (North, South, East, and West), we used a set of different partitions (Appendix 2). In order to check if peripheral areas tend to forge ties with more central areas, we compared Eastern cities and non-Eastern cities, Southern cities with non-Southern cities, and South-Eastern cities with North-Western cities.

With regard to the first partition, our findings illustrate that cities forge ties in line with the expected values, that is, their ties are evenly distributed among Eastern cities and with non-Eastern cities (Appendix 2). In contrast, Southern cities tend to create fewer links between one another, preferring to build external connections with non-Southern cities as partners ($p < 0.05$). At the same time, non-Southern cities prefer not to forge ties between one another. Put differently, it seems that Southern cities exhibit a rather peculiar form of behaviour that is not observed for non-Southern cities. Finally, with regard to the third partition, namely, South-Eastern LAUs *versus* North-Western LAUs, the former tend to avoid South-Eastern partners. This shows that cities located in peripheral countries tend to avoid collaborating with partners from the same macro region. In contrast, cities located in the North-Western countries forge ties randomly (Table 3).

In sum, our second research proposition (**RP2**) is only partially corroborated, as large cities prove to be acting as the main ‘attractors’ within the URBACT network and share a larger number of ties among themselves while avoiding establishing ties with small cities. Yet, cities from Southern and Eastern Europe are engaged in heterophilic behaviour, preferring partners from different macro regions. Although the capacity of URBACT to encourage connections between cities of different sizes, thereby enhancing the exchange of perspectives, backgrounds, and local knowledge on sustainable urban development policies, has proven limited, the programme enabled stronger connections between small and medium-sized cities from Southern and Eastern countries, thus favouring the possibility of mutual learning and capacity-building dynamics between them.

The research proposition **(RP3)** concerns the frequency with which the different types of cities have acted as lead partners in the URBACT environmental projects, expecting that small and medium-sized cities could act as project leaders, due to the facilitating role of the URBACT project. Our findings show that population size appears to be correlated with being a lead partner. Also, geographic position matters a lot in this sense, with Eastern European cities being less likely to lead project networks (Table 4).

The idea that lead partners are the powerhouse of networking can be challenged by other considerations, including the fact that lead partners are relevant to co-ordinating the established networks, but do not necessarily play an important role in promoting networking connections. In fact, as Figure 6 illustrates, the URBACT project’s lead partners (marked in black) do not show a high level of centrality, as measured by the eigenvector

Table 2. E-I routine based upon city size (threshold 250,000) based upon Ucinet (Borgatti et al., 2002).

	Expected	Observed	Difference	*P* >= Diff	*P* <= Diff
Small-Small	293.623	314.000	20.377	0.120	0.891
Small-Large	328.167	281.000	−47.167	0.999	0.002
Large-Large	89.210	116.000	26.790	0.011	0.991

Source: Author’s elaboration based upon the data reported in the URBACT database.

Table 3. E-I routine based upon geographical partition based upon Ucinet (Borgatti et al., 2002). permutations 10,0000; random seed 22,107.

	Expected	Observed	Difference	*P* >= Diff	*P* <= Diff
North-Western – North-Western	95,638	113,000	17,362	0.068	0.942
North-Western – South-Eastern	333,086	346,000	12,914	0.187	0.834
South-Eastern – South-Eastern	282,276	252,000	−30,276	0.971	0.034

Source: Author's elaboration based upon the data reported in the URBACT database.

Table 4. Regression, using Ucinet (Borgatti et al., 2002). permutations 10,0000; random seed 32,767.

	Lead partner	Eigenvector c.	Betweness c.
Lead partner		0.061 (0.0308)	0.0458 (91.8324)
Population	0.0836 (0.0000)	0.141 (0.0000)	0.1924 (0.0001)*
South	−0.1592 (0.0637)	−0.1722 (0.0248)	−0.0651 (73.7965)
East	−0.1914 (0.0679)*	−0.0616 (0.0265)	0.149 (78.9919)
Adj R-square	0.025	0.025	0.042
Sig (per)	0.051	0.091	0.038
N	160	160	160

Source: Author's elaboration based upon the data reported in the URBACT database.

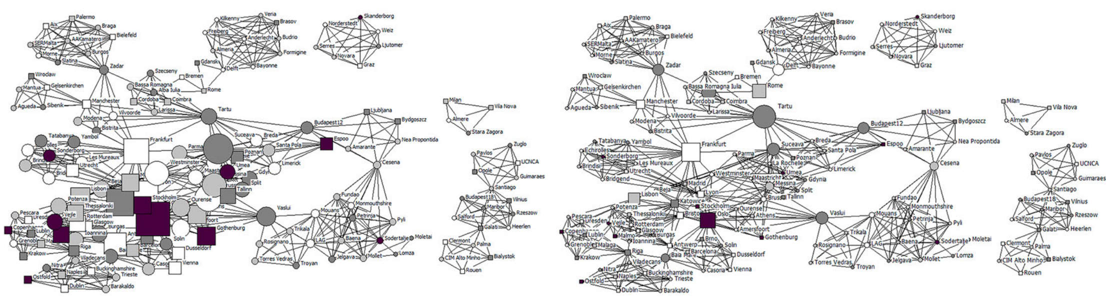

Figure 6. The URBACT network of cities (lead partners in black, size by eigenvector on the left, betweenness on the right). Source: Network graphed with Netdraw (Borgatti, 2002).

index (left panel), or by *betweenness* centrality (right panel). Statistically, there is no positive correlation between being a lead partner and having a large eigenvector centrality (see Table 4). The same holds true for *betweenness* centrality.

In contrast, population matters. As size grows, there is a higher chance of having a large *betweenness* centrality, i.e. in bridging the various (sub-) components of the networks, and thus creating connections across the URBACT network, which can lead to broader knowledge creation and sharing. The same does not apply to eigenvector centrality.

Thus, our findings do not corroborate **RP3**, as larger cities do not tend to play the role of lead partner. However, the network dynamics that are mapped in Figure 6 contribute further important insights, as they show that being project leader does not entail the capacity to influence networks, nor to bridge components. Based upon our findings, URBACT proves to be relevant in terms of the leveraging of the collaborative and innovative potential of cities/towns, although this claim should be checked through further in-depth qualitative research.

6. Conclusions

Our findings provide a range of stimulating insights concerning the composition and functioning of transnational city networks in the EU context. While the overall 'orchestration' efforts of the EU via URBACT appear to have been successful in mobilising local authorities of different sizes and from different geographic areas, the SNA methodology allowed us to unveil a few limitations of this network.

Importantly, the URBACT network involves a sizable number of small and medium-sized authorities from Southern, Central, and Eastern European countries that only marginally participated in the consolidated global and European TMNs for the environment and climate (Kern, 2019). Not only have 'ordinary' cities often acted as project lead partners, but they have also contributed to further intensifying the connections within URBACT. Although partnerships and exchange between large and small cities have been limited, multiple co-operative ties have been established between South-Eastern European cities and the North-Western ones, confirming the validity of URBACT as a system of opportunities for local policy innovation and learning through networking, especially for ordinary cities.

Unsurprisingly, large cities have been proactive within the URBACT network, often acting as network brokers that develop and consolidate co-operative ties between one another, which is in line with the logic of 'pioneers for pioneers'. This trend indicates that EU-led city networks are not free from broader transnational climate governance dynamics, in which large and mega-sized cities have played a pivotal role. Therefore, one of the major weaknesses of URBACT, in this regard, has been its limited capacity to activate the 'teaching' (Lee & Van de Meene, 2012) potential of large cities and make the accumulated knowledge and expertise of larger cities available to their smaller counterparts.

Overall, our findings confirm the importance of EU efforts to enhance the creation and diffusion of local knowledge for sustainable urban development, reflecting a progressive Europeanisation process that involves local authorities in EU climate action across top-down, horizontal and bottom-up directions (Carpenter et al., 2020; Kern & Bulkeley, 2009). However, the validity of the presented findings is limited in timeframe and scope, as our research has examined the 2014–2020 programming, considering only the environmental domain of URBACT. A longer time perspective, a large-N analysis and a more comprehensive inquiry on network dynamics within the different thematic strands of the programme (i.e. social inclusion, governance, and urban regeneration) would be needed to understand if and how the EU can boost local learning and innovation potential, especially among small and ordinary local authorities. Also, further qualitative research would be required to spell out the substance of learning processes and outcomes within URBACT networks, illustrating the extent to which policy knowledge and innovations have been actually transferred and absorbed by the participating local authorities. Lastly, it would be extremely useful to understand why some local authorities do not participate in this network or similar networks, despite the benefits which this is expected to bring in terms of local knowledge and capacities.

Note

1. Policy learning has been the subject of an extensive and extremely rich scholarly debate, which has provided a multitude of definitions and conceptions of this phenomenon (Dunlop & Radaelli, 2018). In this study, we are interested in the so-called reflexive learning that has been conceived 'as a deliberate process to adjust the organizational strategies, policy goals and/or policy tools/techniques, responding to past experience and new policy-relevant knowledge' (Domorenok & Zito, 2021, p. 509). As Dunlop and Radaelli (2018) emphasise, this type of learning is often the outcome of interactions within a network (which has also been defined as 'peer learning'), being facilitated by dedicated innovative governance architecture.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix 1

List of Variables

Table A1.1. List of variables considering the 160 LAU.

Variable Name	Description	Min.	Max.	Mean	SD
Number	Number of projects	1	4	1.24	0.577
Lead partner	Dummy Variable (1 = Lead partner in at least one project)	0	1	0.14	0.345
Type	Type of city	1	4	1.46	0.768
Country	Country	1	27	15.36	7.372
Geo partition	Geographical position	1	4	2.79	0.952
Population 100	Dummy variable (1 = LAU with population above 100 thousand)	0	1	0.61	0.489
Population 50	Dummy variable (1 = LAU with population above 50 thousand)	0	1	0.36	0.48
Population 250	Population size according to Eurostat 2020	2,618	3,182,981	307,678.45	474,178.075

Source: Author's elaboration based upon the data reported in the URBACT database.

European LAU structure

Table A1.2. List of European countries with LAUs data.

Size	Number of URBACT LAU	Population	Number of LAU (2021)	Above 50	Above 100	Above 250
Austria	3	8,926,000	2095	10	6	2
Belgium	5	11,566,041	581	30	10	2
Bulgaria	4	6,916,548	265	24	9	3
Croatia	5	4,036,355	556	9	4	1
Czech Republic	1	10,574,153	6258	18	6	3
Denmark	4	5,833,883	99	39	7	2
Estonia	2	1,330.068	79	4	1	1
Finland	1	5,527,493	310	21	9	2
France	12	67,439,614	34966	130	42	9
Germany	8	83,120,520	11002	193	80	26
Greece	11	10,682,547	6137	43	9	2
Hungary	5	9,730,772	3155	19	8	1
Ireland	3	5.006,324	166	8	0	0
Italy	20	59,862,348	7903	141	44	12
Latvia	2	1,893,223	119	5	1	1
Lithuania	2	2,795,680	60	10	5	2
Malta	1	5,161,000	68	0	0	0
Netherlands	8	17,614,840	355	88	32	4
Norway	2	5,425,270	378	19	7	2
Poland	12	37,840,001	2477	89	37	11
Portugal	11	10,298,252	3092	10	0	0
Romania	8	19,186,201	3181	44	25	8
Slovakia	1	5,459,781	2927	10	1	0
Slovenia	3	2,108,977	212	4	2	1
Spain	13	47,394,223	8131	148	63	17
Sweden	5	10,370,000	290	48	19	3
United Kingdom	8	67,081,000	400	383	288	73

Source: Eurostat (2022)

Appendix 2

Statistical analysis

Table A2.1. Chi-square based upon geographical partition (absolute values, expected values, chi-square statistic).

	Urbact Population	European Population	Row Totals
East	45 (32.42) [4.88]	19289 (19301.58) [0.01]	19334
South	56 (42.57) [4.24]	25331 (25344.43) [0.01]	25387
West	47 (83.19) [15.74]	49565 (49528.81) [0.03]	49612
North	12 (1.83) [56.69]	1077 (1087.17) [0.10]	1089
Column Totals	160	95262	95422

Source: Stangroom (2023) based upon the data reported in the URBACT database and Eurostat (2022)

Table A2.2. Chi-square based upon geographical partition, without France (absolute values, expected values, chi-square statistic).

	Urbact Population	European Population	Row Totals
East	45 (51.17) [0.74]	19289 (19282.83) [0.00]	19334
South	56 (67.19) [1.86]	25331 (25319.81) [0.00]	25387
West	47 (38.76) [1.75]	14599 (14607.24) [0.00]	14646
North	12 (2.88) [28.85]	1077 (1086.12) [0.08]	1089
Column Totals	160	60296	60456

Source: Stangroom (2023) based on the data reported in the URBACT database and Eurostat (2022)

Table A2.3. E-I routine based upon geographical partition using Ucinet (Borgatti et al., 2002), 1 stands for non-Eastern LAUs, 2 stands for Eastern LAUs (permutations 10,0000; random seed 16747).

	Expected	Observed	Difference	*P* >= Diff	*P* <= Diff
1–1	366.400	362.000	−4.400	0.607	0.413
1–2	289.263	299.000	9.737	0.274	0.751
2 - 2	55.337	50.000	−5.337	0.749	0.298

Source: Author's elaboration based upon the data reported in the URBACT database.

Table A2.4. E-I routine based upon geographical partition using Ucinet (Borgatti et al., 2002), 1 stands for non-Southern LAUs, 2 stands for Southern LAUs (permutations 10,0000; random seed 660).

	Expected	Observed	Differenc	*P* >= Diff	*P* <= Diff
1–1	299.380	325.000	25.620	0.070	0.937
1–2	325.540	321.000	−4.540	0.665	0.362
2 - 2	86.080	65.000	−21.080	0.992	0.012

Source: Author's elaboration based upon the data reported in the URBACT database